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LECTURE ON FAINTS AND FITS*

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That a large and variegated assortment of clinical conditions may first become manifest by a passing loss of consciousness with or without convulsions is a well-known fact. Diagnosis, particularly some time after a single attack, often presents considerable difficulty. It is therefore useful to collect and correlate the results of recent investigations and advances in this particular field, particularly in the hope that a simple classification may lead to a clearer understanding of the mechanisms involved, and thus facilitate accurate diagnosis and appropriate treatment. In such a wide subject it is only possible to discuss certain aspects which illustrate the problem as a whole and provide a basis for the investigation of the individual clinical case.

Just as there is no entirely satisfactory definition of a faint, though it is rightly attributable to peculiar circulatory maladjustments, so also even greater difficulties beset the exact definition of a fit. Convulsive movements in the form of facial twitchings or muscular jerkings of the limbs may be observed in the severer fainting attacks, and in fits generalized or local clonic movements confined to a limb or muscle group may dominate the clinical picture. Convulsive movements are common to both, but it is equally justifiable to employ the term "fit" to designate those attacks in which muscular movements are absent and an unnatural motionlessness is the prominent feature (Wilson, 1928). Similarly certain fits may occur without loss of consciousness and the convulsive movements be local or widespread. For these reasons I do not attempt to define either the faint or the fit, recognizing that the one merges at times almost insensibly into the other. I propose to limit this discussion to attacks characterized by sudden and transient weakness, loss of muscular control, a greater or less degree of amnesia if not actual unconsciousness with or without convulsive movements.

Clinical Groups

The recognition of cerebral ischaemia as a cause of the convulsive state led gradually to the differentiation of attacks of unconsciousness into two broad groups—the syncopal, due to transient circulatory defects, and the epileptiform, primarily of cerebral origin (Russell, 1909; Sutherland, 1927). Actually between these two somewhat artificial groups there exists a wide gulf—a gulf bridged by the autonomic nervous system. Recent investigations indicate the importance of this link between the central nervous system and the viscera, autonomic reflexes exercising directly and indirectly a dominant role in the control of the circulation and in the maintenance of consciousness. It has long been known that pressure exerted on the carotid arteries in the neck is capable of slowing the heart, and by the work of Hering (1927), Heymans (1929), and their associates it has been conclusively demonstrated that, concentrated at the dilated bifurcation of the common carotid artery—the carotid sinus—a rich nervous anastomosis exists in which lie various sensory receptors reflexly regulating heart rate and blood pressure. This outpost of the autonomic system transmits afferent reflexes to the medulla via the glossopharyngeal nerve, the main efferent channel being over the vagus nerve to the periphery. Recent studies indicate that a hypersensitive state of the carotid sinus reflexes is responsible for certain forms of syncope (Weiss and Baker, 1933), and though the mechanism varies in different instances yet it is sufficient to indicate the importance of the autonomic system in the regulation of the conscious state. Recognizing that cerebral and general circulatory mechanisms are closely interwoven, it seems justifiable and, even if not very exact, at least helpful from the point of view of practical medicine to submit a classification consisting of three broad groups according to the dominant mechanism:

1. Seizures resulting from a disturbance of the autonomic nervous system.
2. Syncope the result of an intrinsic disturbance of the heart beat.
3. Seizures more directly of cerebral origin, due to local structural or general metabolic defects.

Autonomic Nervous System

A study of the common syncopal attack is sufficient to indicate a disturbance of the usual balance between heart rate and blood pressure. Beginning with a sense of uneasiness, muscular weakness, and restlessness, the symptoms gradually advance until the victim becomes aware of a vague abdominal discomfort associated with nausea, which increases the feeling of insecurity. Lightheadedness, blurring of vision, and loss of power in the limbs, accompanied by a feeling of coldness and sweating, are usually recognized before the final collapse. Lewis (1932, 1918–20) has shown that these symptoms are associated with a progressive fall in blood pressure, often a decrease in the heart rate, and has suggested the term vaso-vagal attack to describe the underlying mechanism, cardiac inhibition, sudden hypotension, and diminished cerebral blood flow being the predominant features (Starr and Collins, 1931). Unconsciousness may last a few minutes, during which time examination reveals a striking pallor, particularly of the face, low blood pressure, a weak or almost imperceptible pulse, usually regular but slow in rate—50, 40, or 30 beats a minute or less being commonly recorded. Recovery is gradual, slower than the onset, and in the succeeding hours leaves the victim listless and unsettled.

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Simple syncope occurs under a variety of circumstances. The erect posture, long hours without food, convalesence after debilitating illnesses, hot stuffy rooms, or exposure to cold and damp all play a part, but there is evidence to suggest that the emotional tone of the victim at the moment plays an important part in the precipitation of the attack. A hundred onlookers may see a child run down in the street, but perhaps only one will faint. Received by one or other of the special senses the stimulus itself does not necessarily cause fainting, but the emotional idea—often disgust or loathing—dominant in the mind of the subject at the moment may be the main determining factor in the initiation of these circulatory reflexes, which produces a sudden change in the mechanics of cerebral blood flow. A slow heart beat in itself is not harmful, as witness the rate of 28 or 34 maintained for years in cases of heart-block. Similarly a low blood pressure of perhaps 90 or 100 mm. Hg may be entirely symptomless, but an abrupt alteration from a high to a low level in pulse rate or blood pressure seldom passes without the production of symptoms.

The slow pulse and particularly the abrupt loss of vasomotor tone which form the essential features of simple syncope are in effect a transient disturbance of the reflex control of the circulation exerted by the autonomic nervous system. This suggests that just as receptor organs situated at the bifurcation of the carotids are capable of receiving and transmitting afferent stimuli to the medulla with resulting cardiac depression and lowered vasomotor tone, so also through similar but unrecognized channels the medulla may be influenced from higher cerebral and other centres with a resulting disorganization of these usual circulatory reflexes constantly passing through this busy regulatory area.

Carotid Sinus Syncope

More conclusive evidence of the influence of the autonomic nervous system is afforded by the recent studies of Weiss (1933) and Ferris *et al.* (1935), who have revealed in a group of people liable to fainting attacks a peculiar sensitivity of the carotid sinus to mechanical pressure in the neck. That it was possible, by pressing with the fingers on one or other sinus, to reproduce constantly in a matter of seconds an exactly similar train of symptoms as those for which the patient sought advice yields very good evidence of a hypersensitive state of the sinus mechanism.

Fainting, it was discovered, resulted from one or more of three distinct mechanisms: (*a*) a marked cardiac asystole or sudden slowing of the pulse, with or without a marked fall in the arterial blood pressure; (*b*) a striking fall in the blood pressure without essential cardiac slowing; (*c*) a cerebral type associated with a striking degree of facial pallor, but without alteration in the heart rate or blood pressure level. The origin of the fainting and convulsions in the first two groups associated with bradycardia and hypotension is clearly attributable to a sudden cerebral ischaemia, and is directly comparable to the observed facts recorded in simple syncope. The experimental data indicate such a close parallelism between these two forms of sinus syncope and the simple vasovagal attack that they are almost certainly of a similar nature. Paralysis of the parasympathetic nerve endings with atropine abolished the cardiac, but not the peripheral, vascular changes. Both forms were prevented by the previous administration of adrenaline.

Arteriosclerosis or hypertension was a common clinical finding, but a local mechanical cause for the increased sensitivity was demonstrable in nine of the fifteen cases studied, a small tumour pressing on the sinus in three instances. Furthermore, operative removal of the tumour and section of the sinus nerve supply abolished both the spontaneous and the induced attacks. It is well known that tumours in this situation are often associated with syncope (Cassidy and Page, 1928), and from the studies of the Boston workers the mechanism seems clear.

Cerebral Syncope of Sinus Origin

The cerebral type of carotid sinus syncope, in which fainting occurs without alteration in heart rate or blood pressure, has also been carefully investigated (Ferris *et al.*, 1935). Earlier observations suggested that these seizures resulted from reflex vasoconstriction of the cerebral vessels, but further experiments designed to influence cerebral blood flow cast a doubt on the earlier explanation. In spite of the previous administration of adrenaline or histamine, pressing on the sinus as readily induced attacks, and measurements of jugular blood flow failed to yield evidence of a generalized cerebral anaemia during the seizure. Weiss and his co-workers tentatively suggest for the regulation of the conscious state the presence of a special area or centres in the brain closely related to the autonomic system. Whether in the cerebral form of syncope the afferent reflex from the sinus travels over the same pathways as those responsible for the cardiac depression and hypotensive forms is difficult to decide —probably not. At all events, cerebral syncope was not prevented by atropine, and this suggests more purely sympathetic channels.

In a proportion of cases considerable benefit was obtained by stripping the coats of the carotid artery on the more sensitive side. It is yet too early to judge of the permanence of the results, but a recurrence of spontaneous attacks was observed in three of ten cases operated on. Fortunately hypersensitivity of the sinus mechanism is not necessarily permanent, and much good was done several patients by measures directed to the improvement of their general health. Patients presenting this form of syncope apparently fall into a distinct clinical group. Weiss points out that in virtue of their unstable heart rate, easy fluctuations in blood pressure, and low metabolic rate they might be vaguely classified as examples of vasomotor neurosis or instability. Carotid sinus syncope is a definite entity, and when the problem of repeated syncopal attacks is encountered in practice firm pressure applied first on one side and then on the other for ten or twenty seconds will form a useful clinical test for sinus hypersensitivity. Further, careful palpation of the neck may reveal a local mechanical cause for the recurring seizures.

Postural Hypotension

This peculiar variety of fainting occurs but rarely and has certain characteristic features which clearly indicate a disorder, more or less permanent, of the autonomic system. It is, however, uninfluenced by carotid sinus stimulation. Originally described and carefully investicated by Bradbury and Eggleston (1925) little has been added to our knowledge by subsequent observers. Its leading symptom is readily induced fainting on assuming the upright position. There is a marked and abrupt drop in the systolic and diastolic pressures when the patient stands erect, and this is associated with actual syncope or marked weakness and giddiness. The symptoms are accentuated in hot weather. Two other observations serve to give a clue as to the nature of the disorder. These are a local or generalized deficiency of sweating and the failure of the heart to increase markedly in rate when the patient stands erect. Adrenaline, while it augments

the heart rate, does not restore peripheral vasomotor control, and fainting is still apt to appear after its administration. The heart rate is uninfluenced by atropine. As an explanation for these findings it is reasonable to postulate a decreased activity of the autonomic nervous system amounting to a virtual paralysis of the peripheral vasomotor constrictor fibres. It was also observed that the amount of urine excreted varied with posture, being considerably less in the erect posture, a finding attributable to the decreased renal blood flow when the patient was erect. The extraordinary dependence of the blood pressure upon the influence of gravity is illustrated by the findings of Chew, Allen, and Barker (1936) in one of their patients.

	Recumbent	Sitting	Standing
Blood pressure ...	Systolic, 140 Diastolic, 80	Systolic, 80 Diastolic, 50	Systolic, 40 Diastolic, 35
Pulse rate	64	64	68

Drugs are of little value in influencing the course of the disease. Ephedrine in 50-milligramme doses even as often as every two or three hours does not always prevent attacks (Chew *et al.*, 1936). It is difficult to determine the site of the lesion, but realizing the capacity of the splanchnic area it is conceivable that destruction of the coeliac ganglion or involvement of the lumbar sympathetic roots might account in some measure for the symptoms.

This brief review of recent work serves to illustrate the fact that identical symptoms can be produced in a variety of ways. In each and all the activity of the autonomic nervous system is disturbed in varying degree. By way of contrast it is perhaps a little surprising that syncope is so uncommon after the administration of amyl nitrite. The explanation probably lies in the fact that in this instance hypotension is to some extent compensated by tachycardia. The fact that slow heart action and fall in blood pressure coexist in simple syncope indicates a disturbance in the reflex control of the circulation, a transient failure to stabilize pressure and heart rate. A penalty of the erect posture, these forms of syncope, indicating a maladjustment of the autonomic system, are seldom observed other than in the upright position. The force of gravity constantly puts a burden upon the fine adjustment of the circulatory mechanism. It is also worth noting, from a diagnostic viewpoint, that the syncopal attacks just described are unassociated with a sense of rotation. Giddiness is common enough as a premonitory symptom, but true vertigo is not a feature of the autonomic forms of syncope.

Syncope of Cardiac Origin

Under this heading may be grouped those cases in which the major defect lies in a sudden change in the dynamics of cerebral blood flow consequent upon an intrinsic disorder of the heart beat. The outstanding example is the Stokes-Adams seizure associated with certain forms of heart-block. Attacks may vary in severity, from the mildest associated with only a transient giddiness or unsteadiness to the most critical, in which during a long period of ventricular asystole lasting three or four minutes muscular twitchings with cessation of respiration and urinary incontinence may occur. Under these circumstances consciousness may not be regained for several hours or days after the return of the heart beat. To witness the Stokes-Adams attack in all its dramatic sequence is an unforgettable event in clinical experience.

The literature contains no entirely adequate definition of the term "Stokes-Adams syndrome." Neither Adams (1827) nor Stokes (1846) defined a syndrome, nor did they offer an explanation for their clinical observations. It was Huchard (1893), unaware of the earlier observations of Morgagni (1761) or Spens (1793), who made the original attempt to marshal the relevant facts and defined the triad of slow pulse with syncope and epileptiform attacks as the "maladie d'Adams ou de Stokes-Adams." It is best to confine the term Stokes-Adams seizure to those forms of syncope associated with a defect, transient or permanent, in the conducting mechanism of the heart beat.

The recognition of this type of syncope is not difficult when attacks are witnessed or when, in the intervals between them, a persisting bradycardia suggests the presence of complete heart-block. As a rough-and-ready clinical test the inhalation of amyl nitrite is of help in elucidating the nature of a bradycardia when graphic methods of recording the heart beat are unavailable (Gilchrist, 1934b). As a general rule amyl nitrite does not appreciably alter the ventricular rate when the block is complete, though there are exceptions. Atropine does not yield a reliable test for the presence of complete block (Gilchrist, 1933).

The great majority of sufferers from complete heart-block are seldom disturbed by seizures, though at the time of the total severance of the bundle of His, when the ventricles are for the first time starved of the auricular leadership and momentarily hesitate in the development of their independent rhythm, one or more seizures may be seen. When seizures do occasionally recur they are as a rule readily controlled by ephedrine (Gilchrist, 1934a).

Ventricular Arrest with Intermittent Complete Block

On the other hand there is a group of cases in which fainting attacks due to a transient paralysis of ventricular activity are common. These people do not suffer from a persisting chronic block, but only from time to time does the bundle of His cease to function. As a general rule, perhaps for weeks or months, the heart beats in normal rhythm with no impairment of auriculo-ventricular conduction; suddenly without warning a varying period of ventricular asystole occurs, accompanied by a faint of corresponding severity. This event is followed by independent ventricular beating—complete heart-block—for a brief space of time, minutes or hours, and then almost as suddenly normal rhythm is resumed and the pulse rate rises from 25 or 30 to 70 or 80 or more a minute. It is important to note that in this variety complete block is only evident for a short time after the Stokes-Adams attack, and that even immediately before the seizure there is no evidence of partial block. I believe that this form of heart-block, which affects middle-aged or elderly subjects, is often mistaken for senile or arteriosclerotic epilepsy. It is certainly more common than the number of recorded cases would indicate. Carter and Dieuaide (1923) collected eight cases, and since then only ten others have been reported. During the last few years I have had under my personal observation eight cases of intermittent block with Stokes-Adams seizures.

The diagnosis is not difficult if the absent pulse is noted during the attack or the steady slow rate for a short time thereafter, but the presence of normal rhythm in the intervals between seizures and the frequent absence of all other cardiac symptoms may lead to some confusion in making the diagnosis, as the following case indicates.

Case I

A lady, aged 57, seen in June, 1934, had been having "giddy turns" once a week, once a month, or at less frequent intervals for four years. They occurred when out walking, when sitting quietly in a chair, and rarely when lying in bed. She described the attack as a sudden feeling of "something coming over her," then fell to the ground and remained unconscious for ten minutes or more. Slight twitching movements of the limbs had occasionally been observed by onlookers. Her son, a doctor, noticed on one occasion that her pulse rate was 30 before she had fully regained consciousness. When on holiday in July, 1933, she had an attack, felt faint, fell, and lay in the street unconscious for nearly half an hour. A consultant who saw her some days afterwards found her pulse rate 70, regular, and electrocardiograms showed normal rhythm. Her blood pressure was then 150 systolic and 70 diastolic, the radial pulses were equal, and the vessel walls healthy. Owing to her obesity it was not possible to determine accurately the size of the heart, but the electrocardiogram demonstrated a marked left-sided preponderance with normal conduction time. A soft systolic murmur was heard in all areas. As no evidence of heart-block was found at the time of examination a diagnosis of simple syncope was made.

On June 4, 1934, I saw her for the first time, and at her home shortly after an attack recorded an electrocardiogram which showed conclusively the presence of complete heart-block. On June 8, suspecting from the frequency of the seizures that the block would be transient, a further electrocardiogram was recorded. This revealed a normal rhythm, the picture being exactly similar to that recorded the previous year (July, 1933) some days after an attack. These facts were sufficient to indicate the mechanism of the production of the syncopal attacks, and justified a diagnosis of intermittent complete block with Stokes-Adams seizures. Adrenaline and ephedrine reduced the frequency of the attacks for a time, but she died a year or so later during an attack.

A further case indicates the benefit which may result from appropriate treatment.

Case II

A schoolmaster led a very active life until at the age of 61, in 1925, he had a sudden attack of unconsciousness while in church. Immediately after the seizure the pulse rate was recorded at 35 a minute. Attacks recurred at intervals of a few weeks, but with the passage of time they increased in frequency until by 1934 he was experiencing as many as six Stokes-Adams attacks a week. Life was made a misery for him. He had no other cardiac symptoms. Seizures occurred at any time, in bed at night, moving about in the house, or when working in the garden. In some he fell unconscious; in others he was momentarily giddy for a few seconds. He knew of no provoking cause. Attacks were sometimes absent for a few days at a time. On other occasions he had as many as four or five in twenty-four hours. Seen in May, 1934, the pulse was regular at 80 a minute, the heart of normal size with no evidence of valvular disease, and the blood pressure 124 mm. Hg systolic and 68 diastolic. There was a marked degree of generalized arteriosclerosis. He was thin and under weight, and had suffered from a mild glycosuria, controlled by diet without insulin, since 1931. The urine was negative. An *x*-ray of the heart revealed no abnormality, and his electrocardiogram in the interval between attacks was of normal form without any evidence of heart-block. He was advised to take 1/2 grain ephedrine thrice daily. Under this treatment the attacks ceased and there was a great improvement in physical well-being and mental alacrity. In March, 1936, he had two minor attacks. In August, 1936, he had two attacks: these were attributed to the fact that he had forgotten to take his usual dose of ephedrine. Otherwise, during the past two and a half years he has had no attacks, and his improvement in health is remarkable.

In this case the diagnosis was made on the frequency and character of the seizures, the recognition of the slow pulse immediately after the attack, and the regular normal rhythm at other times. The absence of other circulatory symptoms, such as dyspnoea, precordial pain, or oedema, would appear to be a common feature of these examples of cardiac syncope with intermittent complete block. My experience indicates that there are in all probability different clinical types of intermittent block, and doubtless the mechanism responsible for the abrupt and unexpected cessation of ventricular beating varies in different cases. In some, local lesions in the auriculo-ventricular bundle may be responsible; in others reflex vagal influences, or the ventricles may be limited in their range of rate.

Paroxysmal Tachycardia

A diminished cerebral blood flow may result from an excessive ventricular rate when the volume output per beat is greatly diminished. In these cases mild syncopal attacks or epileptiform seizures occasionally occur, and are usually preceded by a sensation of violent and rapid palpitation (Barnes, 1926; Clarke, 1907). In my experience fainting from this cause is more common in the later age groups, when sclerosis of the cerebral arteries might be expected. Younger people, the subjects of paroxysmal tachycardia, seldom complain of syncopal attacks. In either group the seizures are more often seen if the paroxysmal heart action begins when the subject is in the erect posture. It should be remembered that digitalis is a potent cause of paroxysmal tachycardia when used to excess in unyielding cases of congestive heart failure. Strangely enough, in this instance palpitation is seldom noticed by the patient, but the abnormal rhythm should be suspected when there are fits or faints during the treatment of congestive failure.

There are other cardiac causes for faints. After coronary thrombosis the acute fall in blood pressure may sometimes be responsible, or the damage done to the muscle may account for the development of a ventricular tachycardia with epileptiform seizures at the time of development of the abnormal rhythm. I have seen several examples of this cause of fainting and some wonderful recoveries under quinidine therapy. Syncope occasionally accompanies angina of effort. Valvular lesions are, however, rarely associated with syncope. I agree with Levine (1936) that of the valvular defects aortic stenosis rather than regurgitation is the commonest form associated with syncope. Clinical evidence leads to the conclusion that it is not so infrequent a lesion as pathological observations might indicate.

Syncope in the mind of the layman is closely associated with cardiac disease. Fortunately in young people organic vascular damage is as a rule easily excluded, but the pendulum has swung too far, and in my opinion it is justifiable to assert that fainting attacks in middle-aged or elderly people are a not uncommon symptom of cardiac disease, sometimes the only one. Even though physical signs are lacking, yet a careful clinical history and simple observations directed to the rate of the heart may give a valuable clue to diagnosis and suggest successful treatment.

Cerebral Seizures

The features of the major epileptic attack are well known. Petit mal is occasionally mistaken for a simple faint—but the more gradual onset, the longer period of unconsciousness, and the slower recovery favour simple syncope. Hysterical fits are now so infrequent that difficulty in diagnosis seldom arises (Bramwell, 1936). Convulsions may be seen in such a variety of conditions—Walker (1936) has listed over sixty different states in which

fits are of frequent occurrence—that it is not surprising that one common denominator applicable to all and sundry has not yet been found. The recent work of Gibbs, Davis, and Lennox (1935) supports the view that the fit is accompanied by an altered conduction of the nerve impulse and increased irritability of the nerve cells, alkalosis and waterlogging being factors of importance in the initiation of the unknown mechanism of the fit (Lennox, 1931; Lyon and Dunlop, 1933). Oxygen lack has its advocates, but in my opinion the convulsions of the Stokes-Adams seizure are not strictly comparable to the fit of idiopathic epilepsy. Having personally witnessed a large number of Stokes-Adams seizures of all grades of severity, my experience is that in grand mal the clonic stage lasts longer, and the sustained violence of the generalized muscular efforts sharply distinguishes it from the irregular jerking movements of the limbs commonly witnessed in the Stokes-Adams attack. Further, the convulsions of heart-block are not preceded by an aura, and the automatic behaviour, common enough after an epileptic fit, does not appear. Incontinence of urine may occur in either condition. In spite of the fact that inspection of the brain of epileptics at the initiation of an attack shows a cessation of pulsation in the pial arteries (Penfield, 1936), usually widespread over the hemisphere even though the seizure involves only one part of the body, the available evidence indicates that cerebral anaemia in itself is not the cause of epilepsy. So far as the cerebral circulation is concerned epileptic people have a peculiar vasolability (Penfield, 1936), but there is no proof that vasomotor phenomena actually cause the fit. Oppenheimer and Fishberg (1928) hold that the fits of eclampsia, lead poisoning, and glomerulonephritis are attributable to local vasoconstriction with high blood pressure, but the cause of the vasomotor change remains a mystery. Epilepsy of symptomatic origin is probably most often the result of cerebral tumour, particularly when situated in the frontal, parietal, or temporal lobes (Walker, 1936; Gibbs, 1932). Neurosyphilis and hypertension with vascular disease are next in importance. Epilepsy is not uncommon even several years after penetrating wounds of the dura, and the recent careful studies of Penfield (1936) lend hope to the view that surgery will accomplish more for the subjects of traumatic epilepsy in the future. The recognition of cysticercosis as a not infrequent cause of fits is of more than academic importance (Dixon and Smithers, 1934). Modern methods of investigation lend increasing support to the view expressed by Oppenheim (1911): "We must always be on guard when the epilepsy develops during later life."

The Epileptic Borderland

In this connexion it is worth referring to the peculiar attacks designated by the terms "narcolepsy" and "pyknolepsy." In the former sudden short attacks of sleep occur unexpectedly and strange attacks of "cataleptic" paralysis brought on by emotion, particularly laughter, make it an easily recognized if somewhat uncommon malady. Recently Prinzmetal and Bloomberg (1935) have obtained better results in its treatment by the use of benzedrine sulphate than with ephedrine, which hitherto has not proved very satisfactory. Pyknolepsy is confined to children. It consists of innumerable attacks, unassociated with mental deterioration, often indistinguishable from petit mal, except perhaps in their frequency and in their resistance to all known forms of treatment. Fortunately the fits invariably end spontaneously by the time puberty is reached.

The syndrome originally described by Gowers (1907), who suggested the term "vaso-vagal attack" to describe it, might perhaps be renamed in order to distinguish it from the simple syncope or vaso-vagal attack of Lewis. "Vaso-medullary seizure" may be a more apt term, particularly as Ryle (1931, 1934) suggests that this condition is associated with a medullary "storm." Its relationship to epilepsy is obscure and perhaps no more than fortuitous, but in the absence of accurate records of blood pressure, pulse rate, and response to drugs, it is not yet justifiable to include this peculiar state amongst the better-known disorders of the autonomic nervous system.

Arising sometimes unexpectedly, but often after a period of prolonged mental strain or anxiety, the attack is sudden and lasts for ten minutes or half an hour before the symptoms begin to abate. The most striking, urgent, and dreaded of the symptoms is a sense of impending death (Ryle, 1934). With this comes a sense of utter powerlessness and profound weakness, a sense of unreality in the environment, a sinking or floating feeling, and occasionally some precordial discomfort, often distinct dyspnoea, a sensation of choking, or tingling in the extremities. Facial pallor, cold perspiration, and an appearance of grave illness are at once evident. The pulse is generally slow and of poor volume. The attack is not a hysterical phenomenon, though it is often vaguely labelled "nerves" or confusedly designated a "heart attack." In some ways, particularly in its utter helplessness, it resembles the milder symptoms of hypoglycaemia experienced by certain diabetics. So far as I am aware these attacks, alarming in themselves, are never fatal, and, whatever the precise mechanism, reassurance as regards the future, combined with sedative drugs—such as small doses of luminal—does much to diminish their frequency. In diagnosis a careful analysis of the patient's symptoms, the fact that consciousness is maintained, the duration of the attack, and the gradual recovery without convulsions serve to distinguish the condition from either the Stokes-Adams seizure or the epileptic attack. I have seen several examples of this condition, one man developing true idiopathic epilepsy five years after the first vaso-medullary seizure. This sequence is, however, exceptional.

In such a large field I realize that I have only touched on a few aspects of a fascinating clinical problem. My remarks have been based on personal experience of some of the difficulties of diagnosis—difficulties, I believe, which can be largely surmounted by an accurate clinical history, but more particularly by the good fortune of actually witnessing the attack, for accurate clinical observation and detailed but simple facts will solve most clinical problems.

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AN INVESTIGATION OF INTERNAL RADON THERAPY

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In this country the use of radium has been largely confined to its local action in the treatment of malignant conditions in which the objective is a destructive or deterrent effect upon the growth. In America and on the continent of Europe radium and other radio-active substances have been administered internally in small doses spread over long periods as therapeutic agents in a wide field of medicine, and considerable claims have been made as to their value. Apparatus capable of producing radio-active solutions for oral administration, injections containing small quantities of radium salts, and radio-active pads for external application have, however, appeared on the market here, and there is some evidence that their use is on the increase. Many of these are available not only to the medical profession but also to the public.

It was thought worth while at this stage, therefore, to investigate certain aspects of the subject under complete hospital routine, and the present paper is an account of the results obtained during the last five years. Although, as will be seen, the therapeutic results have been largely of a negative character, this is thought to be no reason for omitting to publish the data.

The objects of this investigation were: (1) to determine what physiological or biochemical changes might be induced in patients by such comparatively small doses as those generally used; (2) to assess the value, if any, of such treatment upon various diseases; and (3) to ascertain the effects of stronger dosages than those hitherto employed and to find when they become dangerous. Before recording the results of our experiments the following brief survey of what is sometimes known as "mild radium therapy" and of the literature available upon the subject is given.

Mild Radium Therapy

The first disintegration product of radium is the radio-active gas radon. From the point of view of therapy it is important to distinguish clearly between the internal uses of radium salts and of radon.

The salts of radium may be given by the mouth or may be injected intravenously or subcutaneously. Both methods are attended by definite risk. If given by the mouth considerable damage may be done to the mucous membrane of the intestines, especially if the patient undergoing treatment is constipated and the salts are held up. When injected intravenously it is stated (Oloff) that 80 per cent. is retained in the tissues, principally in the bone marrow, and that it disappears from these situations only very gradually indeed. Thus deposits of radium are formed from which radon may be produced for a long time.

There is not enough evidence to determine the exact quantity of radio-active salts which constitutes a lethal dose in man, but it is obvious that the internal administration of radium is attended with the gravest risks. According to Gudzent, a single dose of salt containing the equivalent of 0.5 mg. of radium element can prove fatal. Among the women who have lost their lives working with luminous radium paint the total amount of radium found in the body at the time of death ranged from 0.01 to 0.18 mg. The death of an American citizen was caused by the self-administered and repeated use of a solution containing one-thousandth of a milligramme each of radium and mesothorium per ounce of water.

The introduction of radon into the body, however, presents a totally different problem from that of radio-active salts. Its activity does not last long, declining to one-half in 3.85 days and diminishing to less than 1 per cent. in a month. When radon is taken by the mouth about 90 per cent. of the gas is eliminated through the lungs within an hour or two, and no more is exhaled after five hours. It remains in the urine for a longer time, but very little stays in the body to form "active deposit" (Flinn).

There is, however, another important distinction between the uses of radon and radium salts. Radon is a soluble gas, so that when swallowed it can be absorbed from the alimentary canal, and may, through the circulation, reach every tissue in the body. In this way it may be anticipated that there will be very free action by the alpha rays, which are known to have an intense local effect, not necessarily the same as that produced when radium is applied in platinum or other containers which exclude the alpha rays entirely.

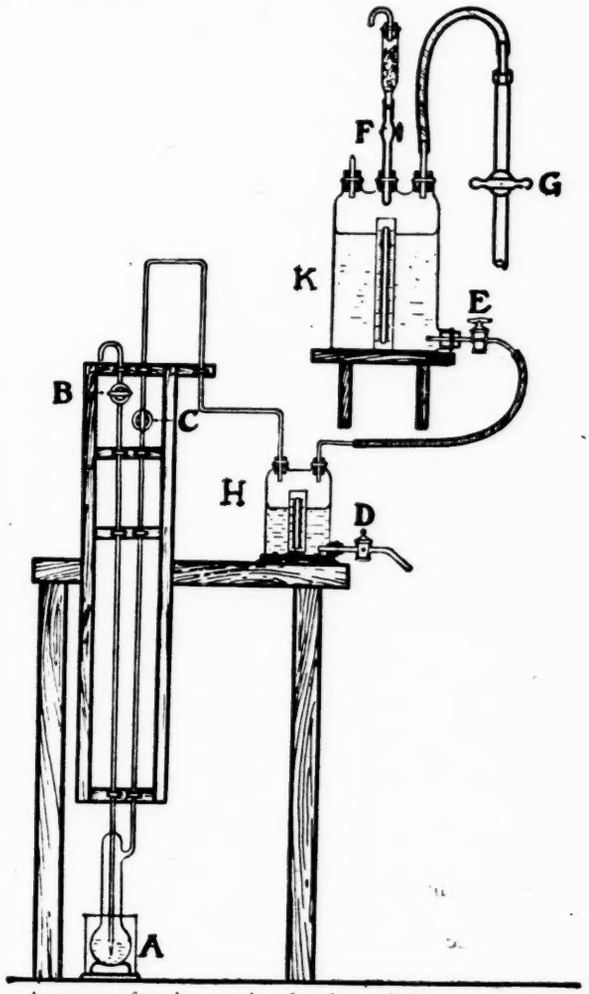
The unit of radon is the millicurie, which is the amount of the gas in equilibrium with one milligramme of radium element. This unit has often been considered much too high for the measurement of very weak concentrations, and the Maché unit has accordingly been substituted; 2,500,000 Maché units are equivalent to 1 millicurie, or 1 Maché unit (M.U.) $= 4 \times 10^{-7}$ millicurie.

Some spa waters are radio-active, and one of the strongest of these is the spring at Joachimstal, which has a content of 600 M.U. per litre. Most radio-active springs contain weaker solutions than this, that of Baden-Baden, for instance, being 104 M.U. per litre. It will be seen, therefore, that the radio-activity of natural waters is exceedingly small, though perhaps not negligibly so.

Artificial radio-active waters can be prepared in very high concentration, but most of the work published on the subject has been done with daily dosage of from 8,000 to 30,000 M.U. per day, usually contained in one litre of water, although some (Bickel) have worked up to

100,000 M.U. From a search in the literature on the subject it appears by far the highest concentration which has as yet been used was in the treatment of six cases at the Radium Institute, London; in one of these the daily dose was as high as 1.5 millicuries.

Some experimental work has been done on animals. Jansen and Schultzer (1926), using the continuous inhalation method in high concentration, found that rats lost weight and died. The coagulation time of the blood was increased, and there was a marked leucopenia. At the post-mortem examinations haemorrhages were found in the lungs, the spleen was enlarged, and there was glandular atrophy.



Apparatus for the supply of radon solutions of varying concentration.

The basis of the claim made for the administration of radon in general therapeutics is that small quantities have a stimulating effect upon cell activity. In addition to this general cell stimulation it is further claimed that radon "has a selective action, promoting the growth of healthy cells, whilst being inimical to morbid ones, that it stimulates the production of erythrocytes, lowers the blood pressure, produces diuresis, and increases the excretion of uric acid" (Saubermann).

From published clinical reports it appears that the most favourable results have been obtained in various forms of rheumatism, although improvement has also been reported in hyperpiesia, in endocrine disturbances, and over a wide field of pathological conditions. Successful clinical results are undoubtedly obtained at many well-known spas, but no statistical evidence has been adduced to show that treatment at those spas in which the radium content is relatively high is accompanied by any enhanced therapeutic effect.

The Present Investigation

Preparation of the Radon Water.—A simple apparatus was required to provide aqueous solutions of radon having a wide range of strength, the mean being about one millicurie in 10 oz. of water. The apparatus to be described has been found to satisfy these requirements.

DESCRIPTION OF APPARATUS

The source of radon is an aqueous solution of radium bromide. It is contained in the small flask A, which has a volume of about 50 c.cm., and which is approximately half full of a solution which contains radium bromide equivalent to about 25 milligrammes of radium element. The flask communicates through glass tubing with the Woulfe's bottle D, which has a capacity of about 250 c.cm., and can be shut off by the stopcock C. A second tube carrying the stopcock B enables radon to be swept out of the apparatus, when the occasion arises, by bubbling air through the solution. The bulb A rests on a rubber pad contained in a stout glass jar, which serves to retain the radium solution in the event of breakage of the bulb. The jar is at floor level, and the flask with its connecting tubing is supported on a wooden framework fitted through the top of the table, upon which the Woulfe's bottle D rests. This arrangement permits heavy screening blocks of lead to rest on the floor and surround the whole table for the protection of the personnel. Further lead blocks are placed close to the jar containing the radium bulb. The supply of water comes from a large Woulfe's bottle K (capacity 12 litres), which is supported on a wall bracket at about a foot above H. It acts as a reservoir, and is fed from the water main, which can be shut off at the tap G. The reservoir is open to the air through the stopcock F, which is provided with a filter of cotton-wool to prevent entry of dust and micro-organisms. The two Woulfe's bottles are provided with scales in order to be able to repeat any particular water level. By varying the level in H it is possible to work with concentrations of radon ranging from 0.02 to 4 millicuries per 10 oz. The actual content of radon is found by measurements on a gamma ray electroscope. With the smallest concentrations the measurements are made by means of the beta ray electroscope devised and described by B. A. Spicer.

METHOD OF OPERATION

The normal positions of the stopcocks are shown in the diagram, but it is well to close C during the initial filling of the bottle H. The bottle H is filled to a mark predetermined by experiment, for it is the water level in this bottle which determines the concentration of radon that is obtainable. Once set, the water level in this part of the apparatus remains sensibly constant. With the tap E shut, the upper reservoir K is filled from the mains to any convenient scale mark selected as a working level. With the main tap shut off the taps E and C may now be opened, and the whole apparatus is left for the radon to diffuse into the vessel H, a proportionate part of it diffusing throughout the water, the coefficient of solubility of which is 0.3 at 14° C. When the steady state has been attained the radon solution is drawn off into any suitable vessel (such as a bottle which can be corked) by opening the tap D. The water in H is automatically replenished from the upper reservoir, the water level in which is maintained by admitting water from the main.

The Clinical Tests

The cases selected for our observations were mostly patients suffering from various forms of rheumatism, such as osteo-arthritis, chronic rheumatoid arthritis, fibrositis, and neuritis, although other diseases were also included in the series. They were separated into the two categories out-patients and in-patients.

OUT-PATIENTS

These patients were given small doses of radon, equivalent to the larger doses referred to in the literature. They came to the hospital daily, and drank measured quantities of radon water. The treatment was begun with one-thirtieth of a millicurie (80,000 M.U.) in 15 oz. of water. Treatment was continued daily for four to six weeks in each case. There were twenty cases in this series.

Clinical notes were taken, including the weight and blood pressure of each patient and also of the general reaction to treatment. Blood analyses were also made. In the arthritic cases the degree of limitation of movement in the joints was also noted, and in some cases *x*-ray photographs were taken both before and after treatment.

In assessing the value of any treatment on purely clinical observation it is important to bear in mind the following pitfalls.

1. *The Psychological Factor.*—Sufferers from chronic disabilities such as rheumatism are extremely susceptible to suggestion. Every physician who is accustomed to dealing with chronic disease is aware of the eagerness with which patients are apt to embrace any new treatment; particularly is this the case when any enthusiasm is shown on the part of the prescriber. Such enthusiasm may be of considerable therapeutic value, but it may obscure the true merits of the remedy. In this instance the very word radium engendered hope. For this reason the patients were not for the most part told the nature of the fluid they were drinking; other steps were also taken to ensure that any effect upon the patients produced essentially by the radon in the water could be substantiated.

2. *Intercurrent Factors.*—All chronic conditions normally run a variable course, with a tendency to remission. The story told by a patient at any given moment, say at the end of a course of treatment, does not necessarily give a fair impression of the trend of events. In the case of arthritis such factors as damp, alteration of temperature, and particularly mental strain and physical fatigue have a temporary but considerable adverse effect. For this reason the symptoms were not only noted during and at the termination of the treatment, but they were also seen at intervals during two years after its cessation.

3. The difficulty of withholding other forms of treatment during the investigation, particularly in cases where local pain is evident. It is frequently impossible to satisfy a patient solely with a general measure, and in cases of increasing pain or stiffness it would be wrong to do so. Such accessory treatments obscure the value of the remedy under investigation.

Taking all these facts into consideration we were unable to find any change in the clinical condition of these patients as the result of ingestion of radon in doses ranging from 80,000 to 240,000 Maché units.

IN-PATIENTS

These were subjected to strict hospital routine, and in them it was possible to make a more detailed investigation, including various pathological tests. They were given much higher dosages, ranging from 1 millicurie (2,500,000 M.U.) to 4 millicuries (10,000,000 M.U.) per day in 10 oz. of water. Various conditions were treated, including chronic rheumatism and hyperpiesia. As controls three cases were given the same diet and general conditions as the treated cases, and the same investigations were undertaken, using tap-water instead of radon water.

In the rheumatic group male patients representing various types of the disease were selected, and these were all admitted to the same ward, so that conditions of diet, fluid intake, and exercise could be controlled to the same standard. Notes were taken of the clinical condition, and general investigations, including radiographs of the joints, were made before treatment began. Initial blood counts and analyses and urine analyses were also made, and these were repeated at weekly intervals during the radon treatment. The following pathological investigations were undertaken.

The blood: The erythrocyte count and haemoglobin index, differential white counts, and, in addition, the blood uric acid, urea, and calcium values were estimated. *The urine:* A routine examination was made, and the uric acid, urea, and creatinine contents were determined. The following results were obtained.

Results

In the majority of cases the blood counts of both red and white cells were uninfluenced. In certain instances, however, the erythrocyte count showed a marked tendency to fall, particularly when a dosage of 2 to 3 millicuries was reached and maintained; in two of these the fall amounted to one million red cells per cubic millimetre.

The differential white cell count was not appreciably altered except in the cases of gout, where there was an eosinophilia. The results of the blood and urine analyses were all within normal limits, with the exception of the gouty cases (vide Table).

GOUT (THREE CASES)

In three patients the administration of radon in large doses caused a definitely increased output of uric acid in the urine, but it was impossible to correlate this with the blood uric acid levels. Two of the cases (Nos. 3 and 5) showed a slight increase in blood uric acid during the early stages of treatment which later returned to the original value, but Case No. 5 developed a subacute attack of gout just as the treatment began, thus obscuring the value of the results. The third case (No. 6) showed a slight fall in blood uric acid level, later returning to the original value.

CONTROL AND RHEUMATIC CASES

In certain of the control and rheumatic cases with the same fluid intake there was a slight increase in the uric acid output, but not, however, commensurable with that seen in the gouty cases. In the controls and rheumatic cases the blood uric acid fell within normal limits.

All the other biochemical investigations, including the estimations of blood urea, calcium, and phosphorus, gave results within normal limits.

Clinical Findings

No improvement was noted in any of the cases of chronic arthritis, whether of the atrophic or degenerative type. No increase in the movement of the joints was obtained, and no relief of pain in the muscles. The general condition remained unaltered. In certain cases of chronic gout, however, there did appear to be an improvement in the general symptoms, and in one instance at the end of treatment there was a marked reduction in the size of the tophi.

A few cases of hyperpiesia were treated. In these an initial fall in the blood pressure was sometimes obtained, particularly when large doses were employed, but this fall

was not maintained, and the final readings were not lower than would have been expected as a result of prolonged rest in bed.

Case Histories from the Rheumatic Group

Case 1.—A patient, aged 30, with spondylose rhizomélique, had had ten years' history of increasing pain and stiffness in the back, spreading to other joints. On admission there was general muscular atrophy and joint fixation, but no focal sepsis or history of gonorrhoea. The temperature, pulse, respiration, and nervous system were normal. An *x*-ray examination of the spine showed complete ankylosis with ligamentous calcification. In both hips and the right shoulder there was complete ankylosis; in the left shoulder and knees there was less complete ankylosis. The bones of the carpus

Case 1

Date	Daily Radon Dose	Blood Counts			Colour Index	Polymorpho-nuclears		Lymphocytes		Monocytes	Eosinophils	Basophils	Hyaline	Blood Urea	Non-protein Nitrogen	Ratio	Uric Acid	Cholesterol	Chlorides	Calcium	Total Protein	Phosphorus
		R.B.C.	Hb	W.B.C.		Per cent.	Total	Per cent.	Total													
25.11.35		5,070,000	84	10,300	0.83	71	7,160	23	2,330	3	2	1					1.70			11.8		
2.12.35	2 mc.	4,540,000	91	10,450	1.0	71	7,400	23.5	2,460	5.0	0.5						2.27		462	12.6		
4.12.35	4 mc.																					
6.12.35		4,860,000	95	10,250	0.96	53.5	5,480	40.5	4,150	4.5	1.5											
16.12.35		4,340,000	92	7,550	1.0	72.5	5,480	17.5	1,320	6.5	3	0.5					1.85		440	12.0		
21.12.35		4,670,000	92	9,950	0.99	70.5	7,080	22.5	2,260	7												

Case 2

5.2.35				6,250		52	3,260	41	2,580	3	2		2	32	34.7	43	1.96	148	480	10.8	5.24	3.36
11.2.35	2 mc.	4,040,000	92	5,650	1.5	46.5	2,630	47.5	2,690	1	4		1	32	34.5	43.4	1.74	155	487	10.5	4.91	3.39
18.2.35	3 mc.																					
26.2.35		4,260,000	81	10,100	0.98	67	6,750	26.5	2,680	3	1	0.5	2	30	32.4	43.2	1.58	160	495	10.1	4.97	4.07
6.3.35		4,450,000	89	11,350	1.01	70	7,940	20	2,270	8	2											
11.3.35		4,365,000	86	8,700	0.99	69	6,000	29	2,520	3	1	1	1	37	33.2	52	2.17	152	560	10.75	5.30	3.45
Radon stopped																						
22.3.35		4,460,000	85	7,300	0.96	56	4,100	37	2,700	4	1.5		1.5	33	33.7		2.36	155	388	10.6	6.26	2.84
5.4.35		4,590,000	86	6,500	0.94	48	3,120	44	2,850	2	2.0	1	1.5	31	34.5		2.34	161	545	10.7	4.98	2.97
19.4.35		3,870,000	90.5	8,900	1.17					Transitional cells 1.5							1.84		413	10.9		

Case 4

19.3.34		6,250,000	110	7,500	0.89	67	5,020	30	2,250	2		0.5	0.5	37	36	48	3.04	150	487	11.45	6.10	3.04
26.3.34	1 mc.													34	36	44	3.66	155	479	11.45	6.20	2.87
10.4.34		5,610,000	104	8,800		59.5	5,220	32.5	2,860	3	2	1	2	28	34	38.6	3.76	139	478	**11.65**	5.08	3.16
23.4.34		5,520,000	110	8,600	1.0	59	5,080	31	2,660	3	4	1	2	26	25	48.5	3.80	124	445	11.15	4.82	2.84
4.5.34		4,645,000	99	8,000	0.9	75	6,000	18.5	1,480	2.5		1.5	2.5	26	23	53	3.68	129	512	11.25	5.34	2.41
After two weeks' camping																						
28.5.34		5,370,000	116	10,000	0.99	62	6,200	32	3,200	2	2		2	32	33	45	4.66	148	365	11.30	7.00	3.34
After six months' work in office																						
26.11.34		5,190,000	105	10,500	1.02	72	7,580	23	2,420	2	1.5		1.5	31	30	48.3	3.04		495	10.80	5.94	2.96

Case 3

Date	Daily Radon Dose	Blood Counts			Colour Index	Polymorpho-nuclears		Lymphocytes		Monocytes	Eosinophils	Basophils	Hyaline	Blood Urea	Non-protein Nitrogen	Uric Acid	Cholesterol	Chlorides	Calcium	Total Protein	Phosphorus
		R.B.C.	Hb	W.B.C.		Per cent.	Total	Per cent.	Total												
15.10.34		5,760,000	106	10,500	0.93	63	6,610	33	3,410	3		0.5	0.5	35	31.9	2.93	161.4	495	10.6	5.38	2.54
19.10.34	1 mc.																				
26.10.34	2 mc.																				
30.10.34		4,650,000	90	9,750	0.97	57.5	5,620	34.5	3,380	3	3	2		36	37.4	4.90	165.2	462	10.8	7.52	2.56
5.11.34	3 mc.																				
12.11.34		4,480,000	88	7,700	0.99	56	4,300	36	2,770	6	1		1	34	37	3.26	158.6	493	11.1	5.67	1.66
28.11.34		3,680,000	92	10,630	1.26	70	7,450	26.5	2,830	2	1		0.5	33	31.5	3.80	160.4	492	10.7	4.73	3.19
30.11.34	Radon stopped																				
3.12.34		4,000,000	84	9,780	1.05	64	6,250	30	2,930	3	2		1	32	32	2.69		561	10.9	4.96	3.16
5.12.34		4,490,000	76	9,550	0.84	58	5,520	32	3,050	6	2										
14.12.34		4,490,000	78		0.87									28	32.8	3.40	171	585	11.7	4.97	
1.5.36		4,300,000	88	12,200	1.02	**65**	7,920	29	3,530	4	1	1									

Case 5

Date	Blood Counts			Colour Index	Polymorphonuclears		Lymphocytes		Monocytes	Eosinophils	Basophils	Hyaline	Blood Urea	Uric Acid	Calcium	Urine Output	
	R.B.C.	Hb	W.B.C.		Per cent.	Total	Per cent.	Total								Uric Acid	Creatine
22 5 36	4,420,000	90	9,700	1.02	52.5	5,400	40	4,120	2	2.5			47	4.90	11.7	0.33	1.17
29 5 36	4,690,000	93	7,600	1.00	56.5	4,300	30	3,280	7	3	1					0.49	1.16
5 6 36	3,970,000	71	10,150	0.89	79	8,000	18	1,820	3	1			46	5.05	10.2	0.97	1.14
12 6 36	4,160,000	76	11,900	0.91	64.5	7,650	27	3,210	0.5	7	1		47		10.4	0.52	1.19
19 6 36	4,490,000	76	8,550	0.85	56	4,780	39.5	3,380	1.5	2	0.5		53	5.30	10.3	0.504	1.07
26 6 36	4,160,000	74	8,650	0.89	72.5	6,280	20	1,730	4	3	0.5		57	5.60	12.1	0.48	1.25
3 7 36	3,930,000	71	9,900	0.91	62	6,120	25.5	2,530	7.5	3			55	4.25	12.1	0.40	1.02
13 7 36	4,499,000	77	10,000	0.86	64	6,400	29	2,900	6				40	4.15	12.0	0.218	1.23
25 9 36 Out-patient	4,860,000	95	6,300	0.98	50	3,150	39	2,460	9	2			57	5.32	10.6		
Case 6																	
19 6 36	4,240,000	76	4,650	0.90	52	2,420	39	1,810	3	4	2		60	4.37			
26 6 36	4,500,000	80	5,250	0.88	49.5	2,600	39	2,100	4	5	2.5		66	4.04	11.0	0.266	1.14
4 7 36	4,420,000	79	8,000	0.89	61.5	4,900	32	2,560	3.5	2.5	0.5		58	3.40	10.9	0.290	1.11
10 7 36	4,630,000	84	9,550	0.91	55.5	5,300	34.5	3,300	3	7			48	3.44	10.8	0.425	1.18
20 7 36	4,700,000	83	9,750	0.88	69.5	6,750	21	2,040	5	4	0.5		48	3.90	10.6	0.404	1.14
29 7 36	4,790,000	84	10,300	0.88	72	7,420	24	2,480	2	2			40	4.15	11.0	0.300	1.06
25 9 36 Out-patient	3,870,000	81	9,200	1.05	62	4,450	24	1,720	10	2	2		44	4.40	10.95		

and hands were rarefied, but there was no ankylosis. Radon was given for two days at 2 millicuries, and for sixteen days at 4 millicuries. The clinical condition remained unchanged.

Case 2.—In a patient, aged 55, with spondylitis the pain in the back had begun eighteen years previously, with progressive stiffness. On admission the nutrition was poor, but there was no obvious infective focus. The arthritis was of the degenerative type, with limitation of movement in the spine, right hip, and right shoulder. There was coincident fibrositis and right brachial neuritis. The blood and urine were normal. Radon was given for six days at 2 millicuries and for twenty-eight days at 3 millicuries. The clinical condition remained unchanged.

Case 3.—A patient, aged 59, had fibrositis and early osteo-arthritis. On admission the nutrition was fair and there was no evidence of infection. There was generalized muscular pain, which was increased on movement. The heart and blood pressure were normal. An *x*-ray examination revealed some lipping of the thoracic and lumbar vertebrae. The blood and urine were normal. Radon was given for six days at 1 millicurie and for twenty-two days at 3 millicuries. The clinical condition was unchanged, but eighteen months later gouty tophi were found.

Case 4.—In a patient, aged 19, with fibrositis there had been a history of two years' increasing pain in upper thoracic region. On admission the nutrition was good, but there was a tendency to dorsal kyphosis, with inability to flex the neck. An *x*-ray examination revealed a possibly normal spine, but there was irregularity of the ninth, tenth, and eleventh dorsal vertebrae. The other joints were normal. There was no evidence of infection or of tuberculosis, and the nervous and cardiovascular systems were normal. There had been no improvement under diathermy and other physical treatments. Radon was given for thirty-seven days at 1 millicurie without benefit. The spine was manipulated later with some improvement.

Case 5.—A patient, aged 49, with tophaceous gout, had had the first attack nineteen years previously in the right foot. Acute attacks followed at intervals of three to six months. On admission large gouty tophi were seen on the knees and ears. One, which had been removed from the finger seven weeks before admission, had left a septic focus. The *x*-ray examination showed a general rarefaction of all the bones of the hands suggestive of coincident rheumatoid arthritis. The blood uric acid figure was 4.9 mg. per cent., and the sedimentation rate was 30 mm. in the first hour. The value of the pathological tests was somewhat obscured by a subacute attack occurring just before treatment. Radon was given for six days at 1 millicurie, for six days at 2 millicuries, and for twelve days at 3 millicuries. Some improvement was noted in the general condition, and there was definite reduction in the size of the tophi.

Case 6.—In a patient, aged 59, with gout, pain began in the left hand and left foot, and there was a four-years history. Other joints had since been affected. On admission there was swelling of the right wrist and left ankle. The *x*-ray examination disclosed the typical punched-out gouty areas and slight rarefaction of bone. The blood urea figure was 60 mg. per cent., and the blood uric acid 4.37 mg. per cent. There was no obvious infection, and the other systems were normal. Radon was given for six days at 1 millicurie, for six days at 2 millicuries, for six days at 3 millicuries, and for six days at 4 millicuries. On discharge the pain and swelling in the affected joints had diminished, and there was some general improvement.

Conclusions

In the series of cases (out-patients) in which radon was given in small doses, such as those obtainable from apparatus in present use, no demonstrable change was found in the clinical condition. Subjective improvement, due to the psychological stimulus and to other factors operating during the experiment, was neither more marked nor more frequent than in the controls. Patients seen two years after treatment did not ascribe any permanent amelioration of symptoms to the treatment. On the other hand the blood counts were not affected, and no injurious results were encountered.

In the series of cases (in-patients) in which radon was given in very much larger doses no improvement was noted in the clinical condition, except in certain cases of chronic gout. The chemical analyses of the blood were unaffected, again with the exception of the uric acid readings in this latter group. More work remains to be

done to determine exactly what value radon has in the treatment of gout.

The erythrocyte count, however, showed a tendency to fall when large doses were employed, in certain instances to a serious degree. It appears, therefore, that with large dosage the administration of radon is attended by definite risk, and it should be administered with great caution.

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PSYCHOLOGICAL FACTORS IN RHEUMATISM

A PRELIMINARY STUDY

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PART I

Psychological factors play an important part in initiating and maintaining illness, especially those forms of illness which are grouped under the heading of general medicine. This is widely accepted, but is vaguely understood. This paper is therefore prefaced with a brief account of the ideas underlying the term "psychological factors" as related to illness.

Psychological Factors

An individual enters the world with a particular structure, a particular chemical and physical make-up, and a particular mode of behaviour. This idea is sometimes put in another way by saying that he inherits a certain constitution (which refers especially to structure), a certain diathesis (which refers especially to chemistry and physics), and a certain pattern (which refers especially to behaviour). Among the patterns which he inherits from his ancestors, his race, and his species are those which drive him to behave as a human being. These patterns of behaviour are often called instincts. They include the deep-seated instincts common to all animals—namely, those of self-preservation—with the drives to eat, to drink, to fight, and to escape; and those of sex—with the drives in the earlier years to love the mother, and later to mate and to succour the offspring. The more distinctively human tendencies include the drives to create and to construct in the physical world of things or in the mental world of ideas.

As an individual grows in time he meets things, forces, and happenings to which we give the name "environment." As he meets new factors in his environment he reacts to them, and sometimes he reacts in such a way that he is described as ill. Illness is not an external object which a person "catches," but is a reaction on the part of the individual to factors of his environment. The environmental factors which provoke a reaction of illness belong to two groups. First, there are those which the individual meets by direct contact of his body tissues. These include the physical agents of mass (which causes trauma); of light, heat, wet, and cold; chemical agents such as drugs, poisons, and foodstuffs; and biological agents such as micro-organisms. Secondly, there are the factors which frustrate, or threaten to frustrate, the instincts and drives of the individual, as, for example, the death of a loved person, being jilted, financial loss, or unsuitable occupation. The individual does not encounter such factors by direct bodily contact but through his mind, and because of this they may be called psychological to distinguish them from physical factors. The study of how the individual reacts by illness to psychological factors is called psychopathology. This science is still in its infancy, and is complicated. However, from the standpoint of general medicine it is convenient to consider the problem in simple terms, and we can increase our understanding of illness enormously if we realize that when the instincts are frustrated emotion is manifested.

Emotional Reaction

The bodily mechanism of emotion consists of the triad of the primitive brain, the autonomic nervous system, and the endocrine glands. By means of this mechanism psychological factors may affect an individual profoundly, bringing about changes in chemistry, rhythm, secretion, and even structure in the whole of the body or in any part of it. This may be illustrated by considering the emotion of grief, which is the response to the loss of a person or object that has been loved.

The acute phase of grief may last for days or for weeks, and is spasmodic or paroxysmal in its effects. The symptoms are numerous, and vary from person to person. They may involve every vegetative system of the body. The classical symptoms include tears, sobs, choking sensations, twitching of the lips and hands, pulling down of the corners of the mouth, obliquity of the eyebrows, a general sense of coldness, distaste for food (especially flesh foods and milk), with a feeling of the food sticking in the gullet, and the "heart turning to stone" or "breaking." This last is a feeling as if some foreign body like a lump of rock or iron lay heavily under the left chest wall, and with each movement, or even with each respiration, dull jags are experienced as if the heart were a stone with broken edges. Also, and this is a point of importance to the subject-matter of this paper, the sufferer between the paroxysms of grief feels sore and stiff as if he had been thrashed.

With the passage of time these bodily disturbances may subside; on the other hand, one or more of them may be maintained in the original or in a modified form. For example, in the respiratory system the chokings and sobs may merge into asthma; in the cardiovascular system the pain of the broken heart into angina and palpitation, and the coldness into vasomotor disturbances of the extremities; in the alimentary system the loss of appetite and the sticking of the food may merge into anorexia, regurgitation, vomiting; and in the locomotor system the soreness and the stiffness may merge into "rheumatism." I have seen examples of all these among insured patients who had never suffered from any of those disorders until they had encountered a bereavement and reacted with the emotion of grief.

In such instances the patient's attention was no longer focused on his bereavement, but was dominated by his symptoms, which he interpreted as evidence that he was diseased in the part of the body affected. It may be added that it is doubtful if grief ever occurs in pure form. It is almost always accompanied by anxiety, which is associated with other emotions, such as fear (for example, concerning the future), resentment (for example, against a person, an institution, or even a mental concept such as justice or the idea of God), and a sense of guilt. Regarding the last, Charles Darwin (1872) wrote: "Under the sudden loss of a beloved person one of the first and commonest thoughts which occurs is that something might have been done to save the lost one—'It was my fault, and I should never have left him.' . . ." Similarly also Groddeck (1929), a German physician who was one of the first medical men to take an interest in psychological factors in organic disease, wrote: "In our civilized society everyone whose mother has died believes that he or she is guilty of her death, believes it even when the mother has died in a place far removed." The bodily effects of anxiety are not infrequently found in psychoneurotic

states which merge from a bereavement, and they take their usual forms of tachycardia, taches, facial pallor, sweatings, giddiness, tremors, etc.

Diagnosis and Rheumatism

When we were students at the medical schools the emphasis of clinical teaching was on diagnosis—the identification of the disease. The chief question to be answered was: "What disease has the patient got?" At that time we did not notice the anomalies of the answers. One patient would be said to have "got" an abnormality in his structure—for example, a gastric ulcer; another an abnormality in his chemistry, such as hyperchlorhydria; another an abnormality in his rhythm, perhaps tachycardia; another an abnormality in his sensation—for example, a headache; another an abnormality, which was presumed but never demonstrated, such as nerve weakness, toxaemia, or being "run down." One of the diseases which a patient might get was rheumatism. Sometimes this term referred to demonstrable structural changes, as in the case of fibrositic thickenings, or the abnormalities of rheumatic fever; but the word was often applied to any patient who complained of pain and stiffness in the musculature in the absence of demonstrable structural or chemical changes. The word "rheumatism" is a label—convenient, comprehensive, scientifically vague.

We were taught also to ask another question—namely, "What has the patient met?" I do not know if the question was ever put in these actual words. As a rule it was framed by asking, "What are the aetiological factors?" Inquiries into aetiology were confined to the physical factors which the patient had encountered, such as trauma, heat, cold and wet, dietary, poisons, and micro-organic invasion. No investigation was made into psychological factors. This was unfortunate, because to limit aetiological inquiry to physical factors is to misunderstand the meaning of illness. The limitation has been and still is the occasion of many unnecessary failures in orthodox medicine. For example, when inquiries are made into psychological factors the disease labels already mentioned frequently "make sense"—that is to say, they become understandable as manifestations of emotional reaction.

To know what a patient has *met* is often of more practical value than to know what a patient has *got*. Aetiology, which regards the individual as a whole, may be of more importance than diagnosis, which, disregarding the individual, concentrates on fragments of his anatomy, pathology, physics, chemistry, sensation, and so on. The questions of aetiology are concerned with the integrated individual, and include:

1. What kind of person is this? That is to say, with what constitution, diathesis, or pattern did he enter the world, and how has that been modified by his environment, both physical and psychological?

2. Why of all the days and weeks of his life did he begin to take ill when he did? This is an inquiry into the environmental factors he encountered about that time which were of a potency and nature likely to cause him to react by illness.

3. Why did he take ill in the manner he did? For instance, why, after a bereavement, does one person remain well, another develop asthma, another disordered action of the heart, another gastritis, another hyperthyroidism, and another rheumatism?

It must be admitted that full answers to these questions are not possible in our present state of knowledge. However, by framing our inquiries along these lines much light can be thrown on the illness of individuals and also of communities. To illustrate the application of these questions in a simple way an example may be quoted of a patient who had "got" rheumatism."

The date of the examination was July, 1935. A single man, 22 years old, who had been on the sick list since March 12 because of severe pains in the right chest, labelled "pleurodynia," complained of weakness, giddiness, sweating, and loss of appetite. His doctor had considered that he might have tuberculosis, but the *x*-ray examination was negative in this respect. His face was pale and worn, and his eyes had a frightened expression. He had tremors of the outstretched fingers, and tachycardia. There was no anaemia, the haemoglobin percentage being 100. The only structural abnormality was a scar below the right scapula, which was the result of falling on a spike four years previously.

Discussion of Diagnosis

The results of examination suggested that the diagnosis of pleurodynia—a change in structure—was possibly correct. The result of general examination indicated that there was disturbance of the autonomic and endocrine systems of a kind that is often diagnosed as hyperthyroidism—a change in chemistry. If we regard a patient not as an individual but as a "case" which contains fragments that can be labelled, we might say, using the jargon, that here was a "case of pleurodynia and hyperthyroidism," and that "appropriate treatment" for these "conditions" comprised massage, sedatives, and perhaps iodine. Now it is curious but true that when we find ourselves using the words "case" and "condition" it is a sign that we have ceased to think further about the problems presented by the patient. Only by discarding these two terms from our vocabulary, and using the terms "person" and "reaction," can we hope to increase our understanding of illness.

Discussion of Aetiology

1. *What kind of person was he?* Physically he was well built and well nourished. Mentally he was intelligent, and was ambitious to get on in the world.

2. *Why did he fall ill when he did—namely, in March?* After leaving school he had entered an ironmonger's shop and had remained there as a shop assistant. He was not happy and felt that "there were no prospects." However, he was continually on the lookout to "better himself," and early in December, 1934, he applied for a position of commission agent which he had seen advertised in the papers. In January he was interviewed, and was told that he was accepted. He immediately resigned his position in the shop. Unfortunately, in his eagerness he had omitted to understand that he would require to provide a capital sum of money before entering on his new duties. He failed to raise the necessary funds, and was informed that he could not become an "agent" without them. He was unable to obtain other employment, became sleepless, went off his food; and suffered from palpitation and weakness. His mother suggested that he might be "in for a decline." At first he refused to see his doctor, but early in March he developed severe pains in the right chest, and was put on the sick list with a diagnosis of pleurodynia.

3. *Why did he fall ill in the way he did?* He took ill with an anxiety state in January, and with pain in March. The reason for the pain being attached to the right side of the chest was probably twofold. First, he had been injured there, and this part of the body was structurally inferior. Secondly, his mother had suggested that he might have tuberculosis, and this fear had directed his attention to the chest.

4. *Had he any purpose in being ill?* His illness acted as an explanation of why he was not working and why he had failed to obtain work.

Comment

Although this man had previously encountered trauma, and, as a result, his structure was inferior at a certain site, he continued working and was free from symptoms for years. He developed symptoms and ceased working only when he met certain psychological factors, which, by frustrating his particular drive, provoked severe emotional reaction. The pain which he then experienced became attached to the site which was structurally inferior.

Pain as an Expression of Inferiority

To encounter a disease or an injury includes not only the experience in the body but also the experience in the mind in the form of knowledge or fear.

Knowledge and fear of morbidity are acquired in popular beliefs; in attending hospitals; in reading; in meeting doctors who talk about "conditions" and "slight weakness" and who give labels to patients in the absence of probability; and also in seeing relatives, friends, or fellow workers affected with certain diseases. A common disease encountered mentally is kidney trouble. Many persons who experience backache, whether through fatigue, physical exertion, or anxiety, become afraid that they have kidney disease. Every doctor in practice knows how patients who come to consult him about pain in the back almost invariably bring with them a bottle of urine, whereas it is very rare for patients with other complaints to do so.

These encounters, however, do not bring about emotional reaction unless the patient is for some reason or other already anxious, and therefore suggestible. For example, a workman will become ill with pains in the abdomen and be labelled "gastritis" after a fellow workman has told him how he had an operation for gastric ulcer, and has demonstrated to him his "belly slit open from here to here," but he will not usually do so unless he is already harassed by domestic, financial, or occupational difficulties. Pains associated with fears of disease not uncommonly appear, especially at first, when the patient is sleeping, and they wake him a few hours after he has gone to bed. Nocturnal onset is a characteristic of symptoms of emotional reaction, not only of pain, but of other bodily disturbances, such as numbness, cramps, loss of power, itching, choking sensations, and palpitation. It may be described in psychological terms by saying that the disagreeable situation and the associated emotions are repressed by the waking mind, but when conscious control is relaxed during sleep the disturbing situation is free to manifest itself in the form of dream imagery and the associated emotions in the form of bodily disturbance. To sum up, inferiority may be inherited or acquired. Acquired inferiority may be either physical, or mental in the form of knowledge and fear.

Pain and Stiffness as Symbols

We have considered how a site may be chosen for pain because it was "inferior" either in a physical or in a mental sense. There is, however, another way whereby a symptom may be attached to a part of the body, and the mechanism involved is known as symbolization. A symbol is something which stands for a mental experience; it represents what a person perceives or feels or desires or thinks. Words, whether written or spoken, are examples of symbols. Thus when the word "hen" is uttered we understand by that sound a certain perceptual experience of shape, colour, sound, and smell. Body gestures are also symbols. If a man in silence spits at a person who is walking along the street that gesture is a symbol which is readily understood. It expresses his feelings towards the person—namely, disgust and contempt; interpreted in verbal symbols—translated into words—it means, *I do not want you: I am ejecting you.* The use of spitting as a symbol of contempt is common to the human species independent of time, place, or spoken language; it is valid from China to Peru; and in that sense it may be described as a species, or "collective," symbol.

Bodily symptoms may also represent symbols which, when correctly interpreted, tell a great deal about what the patient has perceived, has felt, has desired, or has thought. For example, we have already discussed how a complaint of jagging pains and dull weight in the region of the heart may mean: *My heart is sore; my heart is heavy; my heart is broken.* The symptom of pain in the absence of an organic "cause" may be a symbol which signifies: *My feelings are hurt.* For example, I remember a decent working man, aged 50, who had complained of generalized pains and stiffness, had been labelled "rheumatic." but who showed no evidence of structural changes. Inquiry showed that he had worked with the same firm from the age of 14, and that about three months before the onset of his illness he had been dismissed owing to cutting down of staff. After relating the story of his dismissal he himself interpreted his symptoms by saying "Aye, doctor, I took it *ill*; I felt it *sore* after all these years with the firm; I thought it *stiff.*"

Note.—Such symptoms have been called body language—the person is relating his mental experiences not in verbal symbols but in terms of bodily dysfunction. Thus vomiting may mean: I am sick of something or somebody. Coughing may mean: There is something inside me, and I cannot cough it up. Fainting may mean: I am faint-hearted. Frequency of micturition may mean: I am in a piddling funk. The list is endless, and extends from the crown of the head (light-headedness and giddiness, meaning: I am uncertain which way to take so I go round and round) to the soles of the feet (I am footsore and weary). Interpretation of such symbols is sometimes difficult, but sometimes it is surprisingly easy. For instance, there was the woman who complained of "something sticking in her throat." She was thoroughly examined by throat specialists and no structural changes were found. Inquiry into psychological factors showed that her symptoms began three months previously, after a neighbour had called her a prostitute. The interpretation of her symptoms is: I received an insult; I failed to swallow it; it is still sticking in my throat. Again there was the woman who had lost her voice. Inquiry showed that she was a good-living Churchwoman, and that she had lost her voice after learning that her unmarried daughter had fallen pregnant. The interpretation of this symptom is: It is unspeakable; I cannot talk about it; no one must hear it. Then there was the man who complained of continuous vomiting, which dated from the imprisonment of his son, who had always been a source of difficulty. His vomiting signified: I am sick of him; I am spewing him out of my mouth because he is not my son and does not belong to me any more.

Limitation of Movement as a Symbol

The gesture of spitting has been mentioned as a collective symbol of contempt and disgust. It is an example of what Darwin (1872) called an "expressive action." He wrote: "The chief expressive actions exhibited by man and the lower animals are innate or inherited. The young and old of different races, both with men and animals, express the same states of mind by the same movements. Such movements cannot be said to depend on the will of the individual." Limitation of such expressive movements, associated with pain and spasm of the musculature, may also be symbolic. An interesting example is limitation of spinal movement. The spine is the part of the body which holds the human individual erect, and in the mind of the species—the collective unconscious as it has been called—the spine signifies ideas related to uprightness and pride. "A proud man," wrote Darwin, "exhibits his sense of superiority over others by holding his back and head erect." (So also does a dog. I remember observing the behaviour of my fox terrier after he had killed his first rabbit. He swaggered with pride. His body arched earthwards "with the muscles all a-ripple down his back" and his head was "in the air.") In the following description of limitation of spinal movement the lumbar region and cervical regions are considered separately, although, as we shall see, the symbolic significance is fairly similar.

Lumbar Limitation

A complaint of pain and inability to bend is, in the absence of structural change or "inferiority" not infrequently a symbol. Sometimes it signifies: *I am an upright man; I do not stoop to do such things; they are beneath me.* Sometimes it means: *I am a proud man; I do not bend; I do not lower myself; I am above these things.* It will be noticed that there is little difference between the upright man and the proud man; they both act in the same way and say the same things. Pride, in its extended sense of superiority, includes not only uprightness but also independence and self-respect. Patients ill

with psychoneurosis who develop these complaints are usually labelled with the word "lumbago." Instances of such "lumbago" are not uncommon in individuals whose *pride has been hurt,* as, for example, in persons who through unemployment are compelled to take up an occupation which is beneath them; also in individuals whose *rigid independence* has prevented them from applying for public assistance.

Two examples of symbolic lumbago may be given:

1. A shop assistant, aged 40, was labelled "lumbago." He complained of pain right across the lumbar region, and said he "felt as if he could not bend." His symptoms of pain and stiffness began in June, and he had been on the sick list for two months. There was no evidence of structural change, and I could trace no "inferiority." He showed objective signs of an anxiety state.

Discussion of Aetiology

1. *What kind of man was he?* He was an upright man and an elder of the church.

2. *Why did he fall ill in June?* In April he had met a commercial traveller who advised him to "put his shirt on a horse." He had never betted before, but on a sudden impulse decided to follow this advice. He borrowed £10 from a moneylender. The horse did not get a place, and the man was faced with a debt of £10. His wife, an ardent churchwoman, was in charge of their finances, and he always gave her most of his weekly wage. He was afraid to tell his wife about his "fall"—what would she think of me?—and he saw no prospect of meeting his debt. He became sleepless and weak, went off his food, and a few days later declared sick with "lumbago."

His inability to bend was a symbol which involved the two related ideas of uprightness and pride. On the one hand it may be interpreted: *I am an upright man and do not stoop to low pursuits such as betting*; on the other hand it signifies: *I am a proud man and cannot lower myself by telling my wife.* It was clear that he had to lower himself. We discussed his situation, and after "breaking down" he was able to bend quite freely. He left with the intention of confiding in his wife.

Note on Breaking Down.—Patients who have suffered from "rheumatism" with inability to move a joint, and who show no organic change, sometimes on telling the story of the psychological factors they have met and their reactions to them may become able almost at once to move the affected joint freely. For example, I saw a man in the late fifties who for one and a half years had continuously attended the out-patient department of an infirmary for "fibrositis" of the back and "? adhesions of the right hip." He had undergone massage, electrical treatment, diathermy, radiant heat, and dental extraction, and protein shock was now being considered. He was calm and detached, and talked about his symptoms as if he were a medical teacher describing a "case." On investigation as to why he should have taken ill when he did, it appeared that he had been in good health until after he had lost his wife, when he became sleepless and went off his food. In short, he developed chronic emotional reaction out of which his rheumatism had emerged about six months later. He sobbed and cried as he related his feelings following his bereavement. With encouragement he was able to bend his back freely. Also the right thigh, which previously could scarcely be moved, became slack and attained very quickly its full range of movement. It was not localized "adhesions" and thickening of fibrous tissue that required "breaking down" but the individual himself.

2. A house painter, aged 26 and labelled "lumbago," who complained of dull aches in the lumbar region, said he "felt that when he was down he could not rise." His symptoms of pain and stiffness began in October, and he had been on the sick list for three months. There was no evidence of structural change, and I could trace no "inferiority." He showed objective signs of an anxiety state.

Discussion of Aetiology

1. *What kind of man was he?* One would not be justified in describing him as either upright or proud, but rather as flexible and simple of heart. Five years previously he had married on the strength of having obtained a "permanent job with a good firm." He had limited his family to one child in order to "give the boy a better chance in life than his father." He was an enthusiastic Territorial. He often worked about his house, and liked to see it nice.

2. *Why did he fall ill in October?* In June a most unusual thing happened. He was sent to prison for three months because in a political argument he had struck his opponent. Strange to say, his imprisonment did not depress him: "Everyone knew the sentence was unfair." On his release in September he called on his firm confidently expecting to resume his "permanent job," but he was told that the situation was filled and that he need not apply again because "the management would not employ criminals." He attempted with great hope and energy to seek a new situation, but without success. His job was gone, his "nice" house was going, and his boy was not going to get "his chance in life." He became anxious and depressed, and early in October he noticed that after putting on his boots in the mornings before going out to seek for work he experienced pain and stiffness on attempting to rise, and this had persisted. During our conversation he was led to discuss the interpretation of his symptoms—namely, "*Life is stiff and I am feeling sore; I am down and out; try as I will, I cannot rise.* After this, and with reassurance, his movements became free and he agreed he could work if he had employment available.

Note.—Another complaint referred to the back is "weakness," and this is sometimes a symbol which may be interpreted: *I am spineless and have no backbone; I do not stand up to things; I want to lie down to them.* Examples of "back weakness" are seen in persons who are continually losing their employment because of illness which is psychoneurotic but not always recognized as such. I remember one young woman who within a span of two years had been in turn domestic servant, cinema attendant, shop assistant, factory hand, and nursemaid, and who on each occasion lost her situation because of illness which necessitated lying down in bed. The labels of these illnesses were: lumbago, debility, fibrositis, anaemia, and rheumatism.

Cervical Limitation

The neck is concerned in many expressive movements. We have already noted one of these—namely, the action of pride in which the neck as well as the back is involved. The proud man "holds" or "carries his head high." The upright man, like the Pharisee who considered that he was not as other men, "lifts up his eyes unto heaven." The neck is also notably concerned in movements signifying affirmation or negation. To nod the head as a sign of affirmation and to shake it from side to side as a sign of negation are actions which are widespread among the human species, although according to Darwin they are not universal, and depend, apparently to some extent, on social usage.

A sign of negation which is, however, "practically universal" and probably innate is the sudden throwing back of the head. This action as a gesture of negation is largely blurred in adults of this country as a result of training and social habit, but it can be observed very clearly in young children. When a child not yet able to talk says "No" to what is offered—whether it be food or a toy, a suggestion or a command—he signifies his refusal by violently throwing back his head; indeed he may assume the position of opisthotonos. If he continues to say "No" by persisting in holding back the head we describe him as obstinate or stubborn, or, as the translators of the Authorized Version of the Bible put it, stiff-necked. We may recall the New Testament phrase about the "stiff-necked generation" and the line from Isaiah: "they obeyed not but made their necks stiff."

The neck in the collective unconscious represents ideas relating not only to pride (and its correlatives uprightness, independence, and self-respect), but also to refusal, obstinacy, and self-will. A complaint of pain and stiffness in the neck with inability to bow the head is sometimes found to be an attitude of refusal—a symbol which signifies: *I am stiff-necked; I cannot bow my head; I resent this person and this situation; I am obstinate and self-willed.*

Here is a point of special interest. If anyone cares to adopt the "attitude of refusal" and to persist in it—that is to say, if he throws back his head and shoulders and maintains the position for several minutes he will experience dull and cramp-like pains which are most marked in the region between the upper parts of the scapulae. This is a not uncommon site for a complaint of aches and pains with no discoverable organic basis. Inquiries into psychological factors not infrequently show that pains in this site develop in the course of an anxiety state and are an expression of pride (in its extended sense of superiority) and of refusal, resentment, or obstinacy. Such pains occur perhaps most typically in married women who become widowed and are faced with the prospect of living in reduced circumstances or of taking up some occupation as a means of livelihood, but they are also to be found when a person for any reason "gets it in the neck."

Note.—To "get it in the neck" is a slang phrase with which everyone is familiar. A person is said to "get it in the neck" when he receives a definite shock to his happiness, his comfort, or his security as a result of encountering some deprivation or misfortune. Also, perhaps, there is a suggestion that the deprivations and misfortunes are not single but multiple. I have been unable to trace how or when the phrase arose, but it was certainly extensively used during the Great War. Whatever its origin its aptness has been recognized and its use is now widespread. The reasons for this are probably to be found not so much in any conscious associations (as, for example, with hanging or with the guillotine) as in unconscious associations. A man who meets with a deprivation may do one of two things. He may resent it or he may accept it; if he resents it, he throws back his head; if he accepts it, he bows his head. Whichever he does the neck is involved.

Another slang phrase involving the use of the word "neck" is: "X gives me a pain in the neck," or, more commonly, "X is a pain in the neck." This apparently nonsensical phrase has obtained a wide currency. It means that X is found to be a depressing or boring individual and is not acceptable. Thus if someone in a company refers to X and another person says "Oh, X! He's a pain in the neck!" and it can be noticed how everyone throws back his head and no one mentions X after that. In this way X is refused admittance to the company with a "No" symbolized both in slang and in gesture.

Examples of cervical limitation and pain are included in the following serial investigation of patients with "rheumatism" involving the neck and shoulders.

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[*To be concluded.*]

Dame Frances Mary Ryall, widow of Sir Charles Ryall, C.B.E., F.R.C.S., died on October 24, 1936, leaving £66,479 (net personalty £61,351). Her bequests include: £5,000 to the Royal College of Surgeons of England in memory of her husband, to provide a Charles Ryall scholar or assistant in the Museum or Library, or for the promotion of the study of cancer or other diseases; £1,000 each to the Royal Cancer Hospital, Fulham Road, S.W., and the Royal Masonic Hospital to endow a bed in each in memory of her husband; £1,000 to the Bolinbroke Hospital, Wandsworth Common, S.W., in memory of her husband; and £1,000 to the Royal Medical Benevolent Fund.

PLASMODIUM OVALE INFECTION CONTRACTED IN DIFFERENT PARTS OF WEST AND CENTRAL AFRICA

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Although probably *Plasmodium ovale* infections in man are widely diffused throughout Central Africa, having now been reported from a wide belt extending from Northern Nigeria to Kenya Colony, yet remarkably little has been written upon the distinctive clinical manifestations which tend to differentiate it from infections with other forms of malaria parasites. At the present moment *P. ovale* appears to be purely an African species, and there is only one exception to this in the case reported by P. Mühlens from "Western South America." N. H. Fairley (1933), in the record of his case, appears to be the only authority who has paid special attention to the clinical aspects of the naturally acquired infection with *P. ovale*.

Four cases of this infection have occurred in the course of practice during the last two years, two in males and two in females. The infection had been contracted respectively in Uganda, Nigeria, Belgian Congo, and Sierra Leone. The main clinical characteristics, so far as could be ascertained, are the comparative mildness of the infection and the almost invariable recurrence of the rigors and fever during the course of the evening in contradistinction to the usual morning rise of temperature in other species of malaria. Abdominal pain referred to the appendix area had led to a diagnosis of appendicitis being made on clinical grounds in three out of the four cases, whilst in the fourth the pain was referred to the left loin, and was thought to be due to a renal calculus. Subsequent to operation for the appendix rigors occurred and resulted in the demonstration of typical *P. ovale* parasites in the blood.

This observation may be considered to be of some practical importance, although the same phenomenon of "pseudo-appendicitis" has frequently been observed in *P. falciparum* infections. Another clinical characteristic of diagnostic value in these *P. ovale* infections is the rheumatic pain in various parts of the body, especially in the lumbar region. One case had actually been diagnosed as rheumatic lumbago.

Report on Four Cases

Apart from these phenomena, malaria due to *Plasmodium ovale* is a particularly mild disease and is very amenable to quinine or atebrin treatment. The following is a short summary of the cases.

Case I

A woman from Uganda had had mild attacks of malaria there in spite of regular prophylactic doses of quinine. An attack of fever on October 22, 1933, had subsided without treatment. She had complained of pain in the small of the back and over the appendix region, and an operation was performed on October 29 for appendicitis. A rigor followed on the evening of October 31, with a temperature of 103° F. When seen on the morning of November 1 the temperature was normal and the spleen was just palpable. A blood film showed half-grown and gametocyte forms of *P. ovale*; 5 c.cm. of the blood was sent to Colonel S. P. James at Horton, where the parasite was recovered and was used for thera-

peutic purposes. Quinine treatment was instituted, and on November 2 only a few parasites were present. She had no further relapses and no more parasites were found.

Case II

A police commissioner was first seen on December 9, 1935, fourteen days after his arrival in England. He had served for seventeen months in Nigeria, where he had suffered from insomnia and loss of energy, and had complained of pain in the left side, which was attributed to a renal calculus. His spleen was slightly enlarged, but prolonged search revealed no malaria parasites in his blood. On January 15, 1936, he complained that during the three previous weeks he had had several mild attacks of fever; they always occurred at night, and were accompanied by pain in the lumbar region. The spleen was now found to be hard and large, and examination of blood films disclosed a heavy *P. ovale* infection in all stages of development. Atebrin treatment was begun, and on February 1 the spleen was normal again, the blood free from parasites, and he had had no further pyrexial attacks.

Case III

The wife of a company official had been two years in Stanleyville (Belgian Congo), where she had had one attack of malaria in March, 1935. She had a second attack in the following December, which lasted for five days and necessitated hospital treatment. She returned to England on July 14, 1936, and eight days later had an attack of fever with rigor, which began at 6.30 p.m. and was associated with pain in the centre of the abdomen. Atebrin treatment was commenced, but was interrupted by the removal of the patient's appendix on July 24. Two days afterwards the pyrexia returned, the temperature reaching 103° F.; she vomited, and had pain in the back. The spleen was slightly enlarged, and examination of blood films showed numerous half-grown *P. ovale* parasites. Atebrin treatment was recommenced, and the patient made an uninterrupted recovery.

Case IV

An engineer had served one and a half years in Sierra Leone, during which time he had had several mild attacks of fever. In September, 1935, his appendix was removed. When seen first on April 3, 1936, he complained of pain over the gall-bladder area, and was neurasthenic. The spleen was then not enlarged, and no parasites were found in the blood. On May 27 he stated that he had suffered from daily attacks of fever in the evenings, with aching in the bones and lumbar region. The spleen was now much enlarged, and blood films showed a fairly heavy infection with half-grown and gametocyte forms of *P. ovale*. He reacted immediately to atebrin treatment, the aches and pains disappearing on the second day. On August 28 the neurasthenic symptoms had subsided, the spleen was normal, and the blood showed no further evidence of infection.

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In view of the commonness of oligomenorrhoea or amenorrhoea in women with Graves's disease, V. Jonás and E. Markalous (*Zbl. Gynäk.*, October 31, 1936, p. 2614) estimated, by injections into castrated mice, the folliculin content of the urine of eighteen patients with well-marked signs of thyroid hyperactivity. The amount found was on the average about one-seventh of that in normal females, and was less than in patients examined during a remission of the ailment. Of the eighteen women one had normal menses, four oligomenorrhoea, and the rest secondary amenorrhoea.

"RACHI-RESISTANCE" AND SPINAL ANAESTHESIA

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The term "rachi-resistance" has no exact counterpart in the English language. It is used to describe a condition in which an intrathecal injection of an average or a greater than average dose of spinal anaesthetic fluid produces little or no effect. The great majority of failures to produce adequate spinal anaesthesia are due to errors of technique, of which the commonest are inaccurate punctures and faulty postural arrangement of the patient. Failure may also be due to the use of inactive solutions, or very rarely to some pathological lesion such as a cord tumour (Thompson, 1934). However, we are not concerned with these cases here, but only with those where there is no doubt that the anaesthetic has reached the nerve roots without the subsequent production of anaesthesia.

Case Records

In a series of 657 cases of spinal anaesthesia, 300 of which have been recorded elsewhere (Walters, 1932), we have encountered two cases of "rachi-resistance," particulars of which are given below.

Case 1.—A woman aged 33 underwent hysterectomy for multiple uterine fibroids on June 27, 1935. In the left lateral position a smooth puncture was made between the third and fourth lumbar vertebrae, and 1.5 c.cm. of decicaine was injected. The patient was then placed in the ventral decubitus. No anaesthesia resulted. Ten minutes later another 1 c.cm. was given without effect. Lastly, a further 1.5 c.cm. was administered, this time between the second and third lumbar vertebrae. Beyond a slight loss of tactile sensation in the perineum no anaesthesia was produced, and the operation was proceeded with under a general anaesthetic.

N.B.—Decicaine is a powerful anaesthetic solution. In a short series of 104 cases we have had no other failures, and have not exceeded a dose of 2.5 c.cm. even for such major procedures as abdomino-perineal excision of rectum. Decicaine is manufactured by Bayer Products Ltd., and until recently was known as pantocaine, with which preparation it is identical. Chemically it is *p*-butyl-amino-benzoyl-dimethyl-amino-ethanol hydrochloride; its viscosity is 1.8–2, and its specific gravity 1.0009. On an average a dose of 2.5 c.cm. of this drug will give slightly over two hours' anaesthesia.

Case 2.—A man aged 44 was admitted to hospital with thrombo-angiitis obliterans (Buerger). As part of the investigation spinal anaesthesia was used. On July 26, 1935, a smooth puncture was made between the third and fourth lumbar vertebrae; 1.5 c.cm. duracaine was injected. No anaesthesia resulted. Our interest now aroused, we gave 2.5 c.cm. of decicaine on July 29; no anaesthesia ensued. We were by this time convinced that we were dealing with a case of "rachi-resistance"; but in order to exclude all errors so far as possible we decided to try again with yet another drug. On August 1 18 c.cm. of percaine solution, 1 in 1,500, was given, employing the Howard Jones technique (1930). (This is a large dose. Franken (1935) states: "Experience has proved that the dose of 18 c.cm. exceeds the limit of safety.") After ten minutes the patient complained of some tingling and numbness in both legs. After fourteen minutes there was no loss of sensation, but the legs felt heavy. After thirty minutes there was a slight loss of epicritic sensation in the perineum. There was no loss of sensibility to pain in any region, whilst thermal sensibility, tactile sensation, and

deep sensation were unimpaired. The patient showed no evidence of any toxic effect from the drug, except for slight nausea about one hour after administration. In order to complete the investigation a subcutaneous injection of novocain was given, with the production of normal local anaesthesia.

We concluded that this was a definite case of "rachi-resistance," and finally performed lumbar ganglionectomy by the transperitoneal route under general anaesthesia with excellent results.

Rachi-resistance and Rachi-sensibility

Cases which appear to be hypersensitive to spinal anaesthetics are said to be "rachi-sensible." This condition is uncommon, but not excessively rare. Pathological states such as toxaemia from acute intestinal obstruction, increase in urea content of the blood, and jaundice render patients more susceptible to spinal anaesthetic drugs; the physiological state of pregnancy renders women more sensitive to this form of anaesthesia.

On the other hand, "rachi-resistance" is apparently a very unusual phenomenon. After a thorough search of the available literature we are unable to find a reference to it in the English language other than in a direct translation (Sebrechts, 1934a). Sebrechts (1930), however, has paid a good deal of attention to the subject, and the following facts emerge from a perusal of his works.

He states that the cases belonging to the group "rachi-resistant" are found to be predominantly sympathetico-tonic in type, whereas those grouped as "rachi-sensible" are vagotonic in type (1932). This author has also observed that the cases of "rachi-resistance" which have come under his notice have belonged to the same family (one, a father and son; the other, a mother and four sons), and he is convinced that the phenomenon is of a familial distribution. Elsewhere (1934b) he goes so far as to say that it may be a racial property, stating that the Anglo-Saxons appear to be more resistant than the Belgian population.

Discussion

L. J. Witts (1936) in a recent contribution draws a distinction between idiosyncrasy and susceptibility. He states that "idiosyncrasy is a peculiarity of constitution whereby the individual reacts differently from the majority of mankind. . . . In some cases of idiosyncrasy a mechanism akin to anaphylaxis is present, an initial dose being necessary to sensitize the patient."

An idiosyncratic patient thus exhibits a reaction peculiar to himself, and which cannot be predicted unless the family is suspect. For instance, if one of a family is found to be "rachi-resistant"—for example, a father—and the sons resemble him in type (sympatheticotonic), then one might predict that the sons will be "rachi-resistants." Thus we venture to suggest that the phenomenon of "rachi-resistance" can be classed as an idiosyncrasy.

On the other hand the susceptible person requires a smaller than average dose of a drug to produce the standard effect. This is what obtains in those cases which are termed "rachi-sensible," a condition sometimes produced by pathological states, as already mentioned.

Is it possible to find an explanation for "rachi-resistance"? The production of anaesthesia by cocaine and its derivatives is attained by a local depression of nerve fibrils or nerve trunks. In the case of the nerve trunks there is a permeation of the drug through the sheath in order to reach the fibrils, and Sebrechts (1930) points out that this permeation is more rapid and intense in the spinal nerve roots than in the peripheral nerves on account of the less permeable nature of the sheaths of the latter. If one assumes a variation in permeability of the nerve sheaths, then those cases of greater permeability will obtain more intense anaesthesia than those in which permeability is present to a lesser degree. Toxic products circulating in the system might conceivably increase the permeability of the nerve sheaths, thus rendering the subject "rachi-sensible." If, on the other hand, an undue resistance to the permeation of cocaine peculiar to the nerve sheaths of the individual is assumed, this might account for him being "rachi-resistant."

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Clinical Memoranda

Typhoid Abscess 57 Years Later

The typhoid bacillus is well known as a pyogenic organism and one which may be long in producing this effect; in the present case the interval was fifty-seven years.

CLINICAL AND BACTERIOLOGICAL REPORT

A man of 68 and a clear witness was admitted to hospital on May 30, 1936, with a swelling in the left popliteal fossa which had been present for six months, and with a history of some sweating at night for about two weeks before admission. His only previous illness was typhoid fever at 11 years, and this was fixed in his mind, as it came on very soon after a Sunday school outing.

There was no history of injury, and *x* rays revealed no bony lesion. The swelling was incised and drained of its yellow creamy contents. Direct film of this pus showed no *B. tuberculosis* or other organisms, but on aerobic cultivation at 37° C. for eighteen hours a pure growth of *B. typhosus* was obtained. The patient's blood serum agglutinated *B. typhosus* to a dilution of 1 in 50, but no further—a technical "positive." *B. paratyphosus* A and B were not agglutinated. The patient's own organism was agglutinated to a dilution of 1 in 125.

No pathogenic organisms were obtained from the faeces and urine at two examinations. *B. typhosus* was again isolated from the abscess two days later, but not subsequently; the wound healed slowly under antiseptic treatment.

LITERATURE

E. N. Wardle (1935) reported the isolation of *B. typhosus* from a bone abscess at the mid-length of the right tibia, opened at operation in August, 1934, on a man aged 34 with a history of typhoid fever ten years previously. There was a remote history of trauma. The man's serum agglutinated the organism to a dilution of 1 in 125. Wardle also quoted Keen as mentioning a case reported by Buschke, in which the organism was obtained in pure culture from a tibial abscess seven years after the fever.

Brock (1935) described a case of "Post-typhoid Chondritis with Abscess Formation" in a medical practitioner aged 32. Here a pure growth of *B. paratyphosus* B was obtained from

the "1 c.cm. of thin yellow pus" found at operation (in October, 1934) upon a subacute abscess of the first left costal cartilage. The patient's serum agglutinated *B. paratyphosus* B up to a dilution of 1 in 500. There was an indefinite history of paratyphoid fever fourteen years previously, but blood culture and Widal reactions were then negative.

Van Dyk (1933), in a symposium on enteric fever, recalled a man who had typhoid fever during the siege of Mafeking, passed the next twenty-four years as a soldier and a policeman, was kicked by a horse on the lower part of the right thigh, and straightway developed an osteomyelitis at the site. The pus gave a pure growth of *B. typhosus*.

We are indebted to Emeritus Professor Walker Hall and Dr. D. M. Stone, clinical pathologist in the Preventive Medicine Laboratories, for advice and permission to report this case; to Dr. Peters of Ham Green Isolation Hospital for the progress notes and for pointing out the rarity of such a young patient entering the carrier state; and to Mr. T. J. Shields, B.M.A. librarian, for obtaining the references for us.

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Acute Puerperal Inversion

With reference to the clinical memorandum in the *Journal* of October 17, 1936 (p. 760), it might be of interest to quote another case of acute puerperal inversion, the mechanism being the same—that is, traction on the cord.

In the spring of 1932 a Hindu patient was brought to me, having been spontaneously delivered of a living male child 8 lb. in weight. She was about 23 years of age, 4-para. In India an 8-lb. child is large, the average being 6½ lb. The native midwife pulled on the cord and delivered a large placenta by this means. When seen by me the patient was profoundly shocked and bloodless from free haemorrhage. The fundus presented at the vulva, the uterus being completely inverted, with the cervix fairly high in the vagina. The uterus was not palpable from the abdomen. In view of the general sepsis of native methods, and because relatives tend to remove the patient when they think nothing is being done, it was decided to try and replace the organ forthwith. Accordingly the parts were well douched with iodine after cleansing, and under chloroform anaesthesia and by careful and prolonged manual pressure on the fundus in a circumferential manner the uterus was reduced gradually in about fifteen minutes, and resumed its normal position. An intra-uterine iodine douche was now given, but no pituitrin was required, and I was of the opinion that any forcible contraction might reproduce the inversion. Saline infusions were given, and the patient made a good immediate recovery. In about ten days pyometra developed, which responded well to daily intra-uterine douching followed by glycerin. The whole endometrium appeared to be shed—over a period of about two weeks. The patient then developed dysentery, and afterwards malignant malaria, but eventually, after about three months in hospital, went home completely recovered. In a short time menstrual function reappeared, she became pregnant, and delivered a full-time child a year after leaving hospital.

It is interesting to note that during the septic condition of the uterus there was no appreciable involvement of the parametric tissues or adnexa.

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Reviews

ENCYCLOPAEDIA OF MEDICINE

The British Encyclopaedia of Medical Practice, including Medicine, Surgery, Obstetrics and Gynaecology and other Special Subjects. Edited by Sir Humphry Rolleston, Bt., G.C.V.O., K.C.B., M.D., D.Sc., D.C.L., LL.D. Vol. ii, *Apraxia—Carriers in Infective Disease.* (Pp. 767; illustrated.) London: Butterworth and Co. 1936.

The second volume of this work maintains the uniformly high standard set in the first. The editorial team are to be congratulated on their choice of authors for the special subjects, and on the manner in which the articles are set out. By means of cross-headings a summary of the subject may be seen at a glance, and the particular information required is readily obtained. The articles are worth reading as a whole, however, and give an up-to-date statement of the present position of British medicine.

The subjects covered in this volume, AP–CAR, naturally contain much about the brain. A full discussion of regional diagnosis of brain lesions by Dr. F. M. R. Walshe precedes a very satisfactory account of brain tumour, from the medical and surgical aspects, by Dr. C. P. Symonds and Mr. Hugh Cairns, and Dr. Walshe reviews vascular disorders of the brain. The same author does birth palsies and ataxy; and these, with articles by Dr. J. Purdon Martin on athetosis and Argyll Robertson pupil, and by Dr. Macdonald Critchley on apraxia, contain all the information required. This characterizes the articles as a whole, and Professor Hume's account of arrhythmia is a model of saying clearly in short space all that is known. He is guarded enough to leave open what is still in doubt, as in the discussion of the actual side involved in the distinctive electrocardiograms which are accepted as evidence of branch-bundle block, and which at present are best designated as Type I and Type II. Dr. Lakin succeeds in bringing into clear relief the difficult subject of types of peripheral arterial disease and degeneration. It is especially cases of chronic arteritis or decrescent change that are important to recognize early. In senile arteriosclerosis without increase of blood pressure or cardiac hypertrophy it is the diastolic pressure rather than the pulse pressure (the difference) that is likely to be high (p. 60). Much of the difficulty of diagnosis lies in the fact that the adaptability of other vascular areas is so great that a high degree of arteriosclerosis may be met with in some restricted area of the arterial system without any obvious influence on blood pressure. The subject of arthritis and rheumatic diseases generally is discussed from the modern point of view, and a good account is given of present-day opinions and methods. The editor has succeeded in co-ordinating his team of contributors so that the picture is complete without overlap or discrepancy. Mr. Timbrell Fisher's article on osteo-arthritis is practical and helpful, while the subject of backache and lumbago, its diagnosis and treatment by all the available methods, is fully dealt with by Dr. J. B. Mennell.

Two articles, encyclopaedic in conception and result, on the relation of arthropods to disease and on bites and stings, by Drs. Patton and Hamilton Fairley respectively, set a high standard for the sections on tropical medicine. Dr. Fairley's contribution on bilharziasis is that of an expert on the subject. Blackwater fever, beri-beri, and bartonellosis are adequately dealt with by other members of the active London School of Tropical Medicine. Dr. Arkwright's article on carriers in infective disease is sound and practical. Dr. Arthur Hurst sketches a vignette on

biliousness which will be very useful to those who are confronted almost daily by this complaint in practice. Skin subjects in this volume include blastomycosis, baker's itch, barber's rash, boils and carbuncles, and a very practical article on bedsores. Asthma, bronchitis, and bronchiectasis are fully dealt with ; and articles on aviation and caisson disease will interest and instruct members of the profession in the special services. Dr. Adolphe Abrahams takes a broad-minded survey of the relation of athletics to practical medicine, and athletic injuries of the limbs are reviewed by Mr. W. E. Tucker. The management of squeezing and rupture of internal organs like spleen and kidney is not mentioned, though these are not rare in the more strenuous games.

RADIODIAGNOSTICS

Recent Advances in Radiology. By Peter Kerley, M.D., B.Ch., D.M.R.E. Second edition. (Pp. 322 ; 176 figures. 15s. net.) London: J. and A. Churchill. 1936.

Dr. Peter Kerley's small handbook deals exclusively with radiodiagnostics ; no space is given to important advances in technique, some of which would be of great use to the radiologist. The chapter on *x*-ray therapy which appeared in the first edition has wisely been omitted, and we look forward to a special volume devoted to a branch of radiology in which the recent advances are so numerous that they can only be adequately surveyed in a series such as this.

The opening chapters are concerned with injuries and diseases of bones and joints, and with deformities and diseases of the skull. These subjects are somewhat perfunctorily handled ; thus there are only a few lines on epiphyses, which will be of little use to the student who is reading with a view to a diploma in radiology. A bibliography, however, at the end of each chapter will help the student in his search for further information. A large part of the book deals with the chest, and includes diseases of the heart, aorta, mediastinum, lungs, pleura, and the diaphragm. This is in every way excellent, and will prove a valuable guide to the interpretation of *x*-ray films. It gives an adequate outline of the present position of our knowledge of the various diseases associated with signs and symptoms in the chest. The remaining chapters deal with the alimentary canal, biliary tract, and the genito-urinary tract. They present in a very concise form the essential radiographic features of the normal and abnormal conditions met with, and once again a useful bibliography will direct the student to other sources of information.

The illustrations are numerous and of excellent quality throughout. There is a good index, and the book can be recommended to those who want to get a general idea of the value of *x* rays in diagnosis.

MICROSCOPES AND MICROSCOPY

The Microscope. By Simon Henry Gage. Sixteenth edition, revised and enlarged by the addition of a chapter on Micro-Incineration. (Pp. 617 ; 313 figures. 4 dollars.) Ithaca, New York: Comstock Publishing Co. 1936.

The book by Dr. S. H. Gage, emeritus professor of histology and embryology at Cornell University, has now attained its sixteenth edition. This fact alone testifies to its worth, for it is inconceivable that a textbook which was not fulfilling its purpose, and really well at that, should have run through so many editions. And on reading it the reason for success soon becomes evident: it is the author's gift of simple and clear exposition. Starting with a chapter on microscopes and their parts in which the complexities of the modern microscope are approached through a consideration of magnification obtained by hand lenses and microscopes of primitive construction, the author proceeds to discuss the various forms of microscopy. In succeeding chapters the use of the microscope with visible light—bright-field microscopy and dry-ground microscopy—the polarizing microscope, the microspectroscope, and the adaptation of the microscope to use with ultra-violet light are described. Next comes a valuable chapter on the interpretation of appearances, in which is stressed the need for caution and the desirability of submitting material to as many forms of microscopical examination as possible before drawing conclusions. The author is at pains to point out that one should not be satisfied with a mere examination of fixed and stained preparations. Much is to be learned from a study of material in the fresh state both with transmitted white light and dark-ground illumination, and though this is a point of view to which everyone would subscribe it is unfortunately often ignored in practice.

Other subjects covered in this book are the making of drawings of microscopical preparations and microprojection, photomicrography, the reagents used in histological work, and all the technicalities entailed in the making, mounting, and storing of specimens. There is also a chapter on micro-incineration, that recent addition to the histologist's armamentarium. The book contains numerous illustrations, mostly line drawings, and possesses an adequate index.

MENTAL TESTING

A Guide to Mental Testing. For Psychological Clinics, Schools, and Industrial Psychologists. By Raymond B. Cattell, M.A., B.Sc., Ph.D. (Pp. 312 ; 64 figures. 10s. 6d. net.) London: University of London Press. 1936.

The subject of mental testing is now much to the fore and the literature devoted to it is both voluminous and widely distributed. Dr. Cattell has endeavoured "to provide sufficient instructions, test materials, and norms to aid the experimenter in assessing the principal aspects of personality so far made accessible to direct examination." In this he has undoubtedly succeeded. As a work of reference his book should prove invaluable. All the principal tests in common use are listed, together with the materials required, the publisher's name, and, where possible, norms for English subjects. As is usual in such a compilation some errors have crept into the list of tests. Thus the 1919 revision of Porteous's maze test is listed instead of the improved 1933 revision, and the Kent Shakow formboards are not specifically stated to be formboard tests, while the industrial model is referred to as the "complex" instead of by its proper name. These are but small drawbacks to a most valuable list.

As a clinical manual the work is less satisfactory, and the psychiatrist or certifying officer seeking an introduction to the thorny subject of psychometrics from a clinical point of view will find the book's usefulness limited by its author's unswerving loyalty to the tenets of the factorial school of Spearman, both in his recommendation of tests and in his discussion of the psychological basis of testing. The statistical psychologist is interested primarily in the trait rather than in the patient, in mathematical validity rather than in clinical usefulness, an attitude which is justifiable in the laboratory but not in the consulting room. This is especially seen in the emotional field, where the clinician is particularly at home, the statistician particularly at sea. Dr. Cattell as a good statistician condemns, for example, the Rorshach test ;

it is inadequately standardized, it "measures" no "trait," and its interpretation is largely subjective. Yet the Rorshach is perhaps the most valuable weapon we have in the clinical approach to personality problems. Certainly it is of far greater use than the many question-and-answer methods which Dr. Cattell has listed so completely; the direct questionary approach to psychological patients is rarely useful and often dangerous; what physician would submit to a psychoneurotic a list of twenty leading questions dealing with his possible symptoms?

Plainly the gulf between the statistician and the clinician is a wide one, and nowhere wider than in the field of dynamic psychology. Equally plainly there will come with increasing knowledge a narrowing of that gulf. Meanwhile the clinician may be grateful to Dr. Cattell for his statement of an opposing case, and may feel that in stating it he has added to the common store of knowledge, and in doing so has helped to bridge the gulf.

THE THYROID

The Thyroid. Surgery, Syndromes, Treatment. By E. P. Sloan, M.D. (Pp. 476; 99 figures. 45s.) London: Baillière, Tindall and Cox. 1936.

The prevalence of goitre in the Middle Western States of North America is indicated by the figures of the Sloan Clinic at Bloomington, Illinois, which has dealt with 20,000 cases in seventeen years; 15,000 patients were submitted to operation in this period, and the experience gleaned from their treatment has been recorded by Dr. E. P. Sloan in his book. The reader is warned that certain of the views expressed about the principles underlying thyroid surgery differ in many respects from the commonly accepted teaching, and we must say at once that the book cannot be recommended to students. Those who are already familiar with the physiology and pathology of the thyroid gland may find in it much to provoke thought, and even to challenge the beliefs upon which their practice is founded; but the less experienced may be bewildered by the vague circumlocutions which abound throughout the work.

Dr. Sloan's hypothesis to explain hyperthyroidism is that the thyroid normally secretes iodized colloid and a body which he has named "thyrom," the existence of which he infers from the fact that thyrotoxin contains 65 per cent. of iodine. "The other 35 per cent." is thyrom, and since in toxic goitres the iodine content of the gland is diminished he supposes that there must be a proportionate increase in the secretion of thyrom, which produces the signs and symptoms of hyperthyroidism. It is significant that Harrington's name is not mentioned, and we must be pardoned for doubting the authenticity of the author's biochemistry. His suggestion that degenerated tissue in the thyroid may also produce a toxic substance shows how profoundly his ideas differ from those of most pathologists.

On the clinical side also a number of rather confusing syndromes are described and attributed to different toxic agents, so that in all departments Dr. Sloan is out of harmony with the present-day efforts to unify rather than to multiply the causes and symptoms of thyroid dysfunction, and he has not considered Dunhill's more acceptable explanation of the relation between the clinical features and the pathological changes in the thyroid gland. In a book which is intended to be a comprehensive review of thyroid disease more attention should have been paid to the work of distinguished workers abroad.

The technical details of thyroid surgery are well described, but it is most disappointing that we should be told nothing whatever about the results of the enormous number of operations performed at the clinic. The remarks on malignant disease of the thyroid gland are meagre and inaccurate, and the parathyroid glands are incorrectly described and illustrated. This is a big book on a special subject, and we are left wondering how it is possible to write so much without making any substantial contribution to knowledge.

Notes on Books

F. LE GROS CLARK and L. NOEL BRINTON, in their little work *Men, Medicine and Food in the U.S.S.R.* (Lawrence and Wishart, 5s. net), give an instructive survey based on their personal observations in Soviet Russia and their conversations with the health authorities of the active campaign against disease, especially typhus, typhoid, plague, cholera, and malaria, provision for sickness, the food problem in all its aspects, including inspection and laboratory work, and the physical condition of the people. The interest taken by the Soviet Government in the healthy development of the children is indicated by the fact that the number of infant welfare centres in the Union rose from under 1,000 in 1927 to over 2,500 in 1932. In 1922 a State Scientific Institute for Maternal and Infant Welfare was founded in Moscow, and in the course of the next ten years most of the regions of the U.S.S.R. had their own centres. According to the authors the Soviet policy has always allotted the best available food to children, at least in industrial areas, in spite of food often being very scarce. Moreover, the child from an early age is given instruction in hygiene and nutrition. A bibliography of recent literature is appended.

In *Notions de Médecine Aéronautique* Dr. JEAN LEDUC has produced an excellent and useful book, and it is to be hoped that an English translation will be forthcoming in the near future. The book is written primarily for nurses engaged in air-ambulance work. It is divided into two parts. The first deals with such subjects as the effects of altitude, air sickness, intoxication by fumes, and indeed the whole field of the pathology of aviation and the special therapeutic measures applicable. Instructions follow for the appropriate arrangements indicated in the air transport of sufferers from various maladies. The second part covers such topics as the medical supervision of aerodromes, aircraft, and flying personnel; organization of air ambulance services; medical consultations by wireless; and the epidemiological role of the aeroplane. This admirable book is practical, concise, and informative, and it should prove acceptable to all who are concerned in the medical aspect of aviation. It is published by the author, 8, Rue de la Cannebière, Paris, at 20 francs.

The seventh edition of *Public Social Services* (National Council of Social Service, 26, Bedford Square, W.C.1, 2s. post free) incorporates the latest Acts of Parliament and Regulations dealing with this subject, including those concerning unemployment assistance which came into force on November 16, 1936. This concise handbook should be a boon to the busy practitioner, providing a ready guide to those branches of legislation which have a direct or indirect bearing on his work. The book deals with public health, national health and pensions insurance, old age pensions, and the Poor Law; chapters are also devoted to education, industry and employment, administration of justice, and war pensions. Where procedure differs in England and in Scotland the differences are pointed out. In addition to the information on the above services, which are administered under the Government, there is a short reference to industrial assurance, a subject of much importance to the wage-earning community. The book not only describes the various enactments and their methods of administration, but also gives the names and addresses of authorities to whom inquiries and appeals may be submitted. The whole arrangement is practical and concise, while a very complete index renders every item readily accessible.

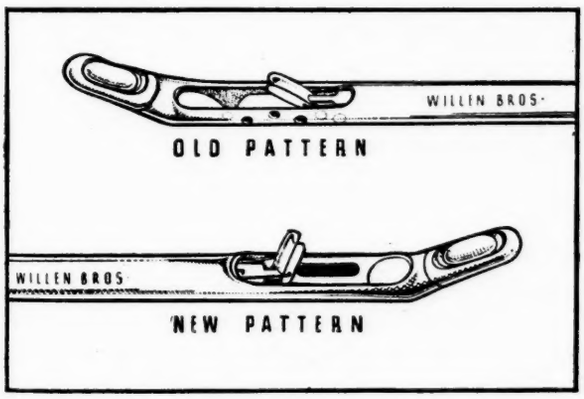
Hopes raised in anticipation were sadly deferred after reading *Cytologie de Liquide Cephalo-Rachidien*, by H. JESSEN (Paris, Masson et Cie, 40 fr.). It is a critical review of our ignorance of a subject about which practically nothing is known. Some estimate of the author's labour may be judged from nearly twenty pages of bibliography, including references to those who have devised methods for exhibiting the cells, for differentiating them, and for enumerating them, efforts mostly mistaken and barren of reliable results. Attempts to arrive at some normal standard for the maximum and minimum limits are all unsatisfactory and open to suspicion, since normal people can rarely submit to spinal puncture for the withdrawal of fluid. In conclusion, the author finds definitely that cells of lymphoid character are present in the cerebrospinal fluid of *presumably* healthy human beings; but their origin and relation to the cells of other tissues must remain uncertain; and, above all, their numbers are very few. He suggests that 0 to 5 per c.mm. should be regarded as normal, 5 to 10 per c.mm. as doubtfully normal or even pathological, and that over 10 per c.mm. is definitely pathological. Surely this rough classification can have but slight practical value, especially as the enumerations are always qualified by the presence of degenerated cells and cellular debris. Apart, however, from his depressing results Dr. Jessen has contrived to introduce a continuous interest into his subject, which from its very elusiveness should not fail to stimulate further research, and the monograph will be invaluable to all future workers.

Preparations and Appliances

IMPROVED IRRIGATING CYSTOSCOPE

Mr. H. P. WINSBURY-WHITE, F.R.C.S. (London, W.1), writes:

I have now used for a good many years the cystoscope which was originally made for me by the Genito-Urinary Manufacturing Company Ltd. To supply an efficient inflow of fluid into the bladder without unduly increasing the calibre of the instrument the inflow is arranged between an inner and an outer sheath. The fluid in the former model escaped from the instrument into the bladder through a number of



small apertures near the vesical end, both on the outer and inner aspects of the sheath. Although it has always proved an excellent instrument for use in the electro-coagulation of bladder growths it suffered from the defect that a strong current would cause bubbles to settle over the telescope window and to obscure the view. This fault has now been remedied by replacing the numerous small holes in the outer sheath by a single elongated inflow orifice. This lies horizontally on the left lateral wall of the interior aspect of the sheath adjacent to the window of the telescope, and measures 10 mm. by 2 mm. The improvement in the usefulness of the cystoscope as a result of this modification is considerable. The alteration was made for me by Messrs. Willen Bros., 55, New Cavendish Street, London, W.1.

OPHTHALMIC TREPHINE SCISSORS

Mr. J. EDWARD MARTIN (Clifton) writes: I designed these scissors to facilitate the dissection of the flap before trephining, and I find them very comfortable in manipulation. The instrument has been made for me by Messrs. John Weiss and Son. The object of the design is to diminish flexion of the operator's wrist and thus avoid impairment of the finer movements of

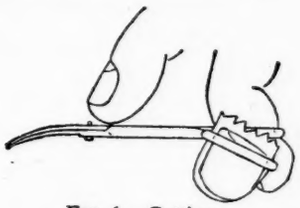


FIG. 1.—Cutting.

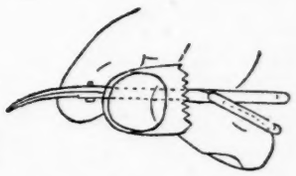


FIG. 2.—Blunt dissecting.

the hand. The details are—length: 3¼ inches; blades: curved on flat, with mean radius of curvature of 1 inch; points: fine, sharp, slightly ground off; joint: screw; bow for thumb: angled at 20 degrees from the straight, as shown in Fig. 1. A transverse section of the joint or shanks (when closed) would be quadrilateral, the flat sides assisting the grip in blunt dissection, as shown in Fig. 2.

CIRCUMCISION CLAMP

Mr. J. S. ROWLANDS (Rhyl) writes:

There is no doubt that the time-honoured, much-discussed, and much-abused operation of circumcision can be inartistically done. In a large measure this is due to the instability and the smallness of the organ operated on, rendering the estimation of the necessary flaps difficult. In order to obviate some of these difficulties Messrs. Allen and Hanburys of Wigmore Street have kindly made to my design a circum-

cision clamp, as illustrated. This is applied to the mid-portion of the body of the penis and is held by the anaesthetist. By means of this clamp the small penis is held firm and in a position more easily dealt with. Haemorrhage is practically *nil*, sutures are more delicately inserted owing to the resistance of the clamp, and lastly, slight pressure is brought to bear on the urethra, thus removing a good deal of uneasiness and expectancy on the part of the operator! I hope that this instrument will help the general practitioner in this particular type of operation.

TO REMOVE PLASTER STRAPPING

Antihaesin is a non-irritant, non-inflammable solution for the painless removal of plaster strapping. It destroys the adhesive properties of the strapping and enables it to be removed smoothly and evenly. The advantages of avoiding pain and shock, especially to patients weakened by illness or prolonged incapacitation, are obvious. For this reason alone antihaesin should be of great interest to surgeons, dressers, and nurses. It may be obtained in 4-oz. and 20-oz. bottles from the makers, Allen and Hanburys Ltd., Bethnal Green, London, E.2.

VERPINE DISINFECTANT

Verpine (C. G. Fox and Co., Ltd.) is an antiseptic and disinfectant fluid which contains aromatic terpenes $(C_5H_8)^n$ and chloroxylenol (2-chloro-5-hydroxy-*m*-xylene) mixed with a neutral solution of soap to render them soluble in water. The solution has a phenol coefficient of 3. It can be used undiluted on the hands, and a 5 to 10 per cent. solution is recommended for use on mucosae and wounds.

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THE WELLCOME TRUST

Many years ago a book was published in America under the title *Inspired Millionaires*. Instead of denouncing those who had accumulated enormous wealth an endeavour, said the author, should be made to inspire them. The process of inspiration has certainly had some success, especially in the country of Rockefeller and Carnegie. The British public has scarcely recovered its breath after the Nuffield benefaction to Oxford before another great philanthropic endowment, of a different character but directed to similar ends, is announced in the shape of the Wellcome bequests. A letter in our correspondence columns from the five trustees appointed under the will of Sir Henry Wellcome, who died in July last, explains that after some personal provisions have been made, including a memorial in Minnesota to the testator's parents, the whole of the divisible profits in Wellcome Foundation Limited will be utilized in two categories—namely, a "Research Undertaking Charity" for the advancement of medical and scientific research, and a "Museum and Library Charity" for the establishment or endowment of research museums and libraries. The Wellcome Foundation was established in 1924 by Sir Henry Wellcome to take over the business of Burroughs Wellcome and Company, manufacturing chemists, with their subsidiary companies in other parts of the world, together with the Wellcome Research Institution, which includes the physiological and chemical research laboratories and the museums of medical history and medical science in London bearing Wellcome's name, as well as laboratories elsewhere. Although for convenience Sir Henry Wellcome registered the Foundation as a limited company he was its sole possessor.

Unlike most other great legacies, the Wellcome gift cannot be estimated in actual figures. A statement appeared in the Press that it represented the income from one million pounds of industrialized capital, or probably substantially more—a figure no doubt suggested by the fact that the company was registered with a capital of one million one pound shares. No information is really available, outside the directorate of the Foundation, on which an estimate can be based. The point is, however, that here we have dedicated to research, not a fixed sum in trustee securities, but the profits and goodwill of one of the best-known businesses in the country, enjoying a high reputation, with interests more or less all over the world. It will be run in future, not for private nor even for co-operative profit, but for the endowment of medical and allied scientific research and the upkeep of scientific institutions. Bequests, even on the grand scale, are not infrequent, but businesses dedicated in perpetuity are rare. One instance of which we have been reminded is to be seen at Copenhagen in the Carlsberg Foundation. Here the founder and proprietor of a brewery originally started research laboratories for the benefit of his business, and at his death left a large part of the earnings of his very successful brewery to trustees with such wide discretion that the Foundation has been a fairy godmother to sciences and arts having little connexion with the actual business of brewing. In the Wellcome bequest, however, the machinery whereby the revenues are earned is in character with the purposes to which they will be devoted, although the purposes, of course, spread out over a much wider field. It may be reasonably pointed out that commercial undertakings, however well established, have usually a short life as compared, for example, with ecclesiastical and university institutions; but those who in future turn expectantly to the largesse which the Wellcome trustees may be able to distribute will not be depressed—and will have no reason to be—by doleful predictions based on the insecurity of commercial and industrial affairs.

By the terms of the will the Foundation remains under a board of directors, the managing director at the time of Sir Henry Wellcome's death, Mr. George E. Pearson, becoming governing director. The function of the five trustees appointed is not to concern themselves with the detailed conduct of the business, which calls for expert direction, but to act as the equivalent of a body of shareholders, holding the property on behalf of those whom the testator intended to benefit and distributing the dividends according to his directions. The will directs that two of the trustees shall always be men of standing and authority in medical and allied scientific research. No more fitting choice could have been made than Sir Henry Dale, director of the National Institute of Medical Research, who for ten years, from 1904 to 1914, was associated with Sir Henry Wellcome as director of the Wellcome Physiological Research Laboratories, and Professor T. R. Elliott (in place of the late Sir Walter Fletcher, who was first nominated) of University College Hospital. Sir Henry Wellcome was concerned for the soundness of the research which his gift would make possible. There is an italicized statement in the will, that "persons of rash and speculative tendencies should be barred"

(as trustees). Other parts of the testamentary phraseology bear a certain likeness to the language employed by the Medical Research Council in the pamphlet describing its own constitution and functions. The medical trustees whom the will named were persons who, in one capacity or another, were concerned in the work of that body, and therefore likely to be in sympathy with the testator's ambitious projects. At the time the will was made (February, 1932) Sir Walter Fletcher was secretary of the Medical Research Council; Sir Henry Dale has long been closely associated with its work, and Professor Elliott was formerly a member and known to Sir Henry Wellcome in that capacity. Of the other trustees two are solicitors and one a chartered accountant. The number of trustees will always be five, and express provision is made in the will that two shall be men of medical eminence, two shall be men of business and administrative experience, at least one of them of high standing and ability in the law, and that all shall be persons in sympathy with the work of the Foundation.

The trustees are given very wide powers. While no doubt one of their cares will be to provide for researches to be carried on in the existing Wellcome institutions, they are by no means limited to these. They can use money for the support of research work in a much larger field of inquiry, no matter where it may be carried on, and without reference to nationality or race. They can subsidize at their discretion virtually any form of medical research. Their aim, to quote the words of the will, is to be "the advancement of research work bearing upon medicine, surgery, chemistry, physiology, bacteriology, therapeutics, materia medica, pharmacy and allied subjects, and any subject or subjects which have or at any time may develop an importance from the invention and improvements of medicinal agents and methods for the prevention and cure of diseases and control or extermination of insect or other pests." Grants can be made either to individuals or to institutions. Any form of research can be subsidized independently of the laboratory in which it is undertaken. Commissions of investigation can be set up. Provision may be made for the publication of the results of research. Special research expeditions—one of Sir Henry Wellcome's particular interests—may be fitted out. The furnishing and equipment of museums, libraries, research bureaux, and laboratories may be provided. Perhaps it is well to add—to prevent the trustees from being overwhelmed by appeals for all manner of researches, deserving or not—that for the next year or two there will be unknown demands on the realized profits of the Foundation. There may well be supplemental sums to be found for death duties, and there will have to be preferential provision for the personal bequests named in the will. But eventually there can be no reasonable doubt that a very large sum will be available annually for the widest purposes of research which is likely to conduce to the improvement of the physical condition of mankind.

Attention is drawn in the letter which appears elsewhere to a proviso on which the medical trustees have insisted. A clause in the will calls upon the trustees to enter into a covenant not to be engaged in or in any way to assist any concern carrying on business in competition with the Wellcome Foundation. A form of words has been added to the covenant, by order of the High Court, whereby any implication incompatible with the position of the trustees as members of the medical profession and independent men of science has been removed, the other three trustees, who were not affected, co-operating in these proceedings. The order not only meets the case of the present two medical and scientific trustees, but empowers any such trustees appointed in future to add this proviso to their covenant. In taking this action Sir Henry Dale and Professor Elliott have evidently intended to make it plain that their acceptance of trusteeship is on conditions which place its scientific independence beyond question. The trust has every appearance of being a big undertaking, perhaps bigger in the next generation than it can be in this. Upon the trustees, especially those representing medicine and the ancillary sciences, a great responsibility will rest for the worthy investment of the sums which periodically become available. Even the trustees themselves cannot as yet see clearly "the shape of things to come." The acceptance of the trust could only be regarded as a public duty—a duty not only to the past, to carry out the wishes of a testator of philanthropic vision, but also to the future, to the various work with unimagined possibilities which may be started as a result of this inheritance. In undertaking the duty, which will not be an easy one, the medical trustees will enjoy the confidence of all their scientific colleagues, and may add another noteworthy chapter to their own eminent services to medicine.

BIOLOGY IN EDUCATION

The plea for the study of biology as an essential part of a liberal education has been made now for many years, and it grows in cogency from year to year. At recent educational conferences it has been reinforced very powerfully by Professor J. S. B. Stopford's address to the Association of Science Masters at the University of Manchester and by

that of Dr. R. H. Crowley at University College, London. From time to time indeed the suggestion has been made that biology should be the basic or pivotal subject on which all education should be constructed or from which all other subjects should radiate. This can be maintained with considerable force; and at any rate there can be few to-day who would deny Professor Stopford's statement that "some knowledge of biology is a necessity for all of us," or Dr. Crowley's dictum that "full physical fitness is impossible unless a sound biological foundation is first secured." Yet even now it is true that biology is only struggling—though struggling successfully—for a place in the school curriculum. Professor Stopford describes it as the "Cinderella of the sciences offered at school," and Dr. Crowley ascribes this to the dominance of "the examination system, which in the past had been the servant and was now the master."

It should never be forgotten, however, that the advocacy of a more prominent and more common position for biology in the schools is based primarily upon general cultural and not upon utilitarian, technical, or examinational grounds; and that much pedagogic wisdom and vigilance may be required to keep the teaching of biology upon right lines, and to prevent its deterioration, as that of chemistry and still more of physics have to a considerable extent deteriorated, in many schools, into a sort of minor technological training in laboratory work or merely a fresh field for exercises in mathematical calculation. As Professor Stopford says, "Biology properly taught has a profound humanizing influence." It provides a link with a large number of other subjects—history, geography, social and domestic science at once come to mind. It is the best introduction to the teaching of science in general, its methods of observation, of selection, of patterning, of the formulation of "laws," of the control of "nature." Biology as the study of living things and as one of those sciences which are at present at any rate not "exact" has a truer educational value than others. The exclusive study of the more exact sciences of physics and chemistry may lead to an undue confidence in particular procedures, to a set and rigid frame of mind, to a lack of interest in human affairs, to the manufacture of the efficient technician rather than of a really educated man or woman. If Dr. Crowley is right in defining the end of education as "learning to live" there can surely be no doubt as to the position which the science of life should have in the school curriculum.

The position of biology in relation to the medical curriculum has never been so clearly envisaged, and yet there need be no confusion with regard to it. It is not difficult to distinguish between biology—along with physics and chemistry—as an "introduction" to human anatomy and physiology and the understanding of human environment on the one hand, and its "application" to these medical scientific subjects on the other. The application of the three preliminary sciences must continue throughout the curriculum just as the application of anatomy and physiology must continue throughout the three clinical years. It is at least equally obvious that the general study of a subject which introduces the student to another should be undertaken before and not *pari passu* with that of the subject to which it is an introduction. It remains a distinct and considerable blemish upon the medical course, as newly prescribed by the General Medical Council, that the study of general biology, wherever it may be pursued, should not in every case be made to precede the entry upon the medical curriculum proper.

CONTROL OF PITUITARY SECRETION

With increasing knowledge of the hormones of the pituitary gland it has become imperative to understand the mechanisms that control the formation of these principles within the glandular elements. The pituitary gland is unique in that it seems to be responsible for the control of all endocrine activity either directly or indirectly. Collip has gone so far as to refer to it as "the master gland." This does not mean that the pituitary gland, while influencing endocrine activity elsewhere, is not in itself influenced by the secretion of other endocrine glands—for example, the changes in the pituitary as the result of castration are profound. Therefore to some extent it can be said that there is an interplay of endocrine activity which tends to preserve the normal state. It has been known for many years that the pituitary gland receives a dual innervation: first by nerve fibres from the hypothalamus which enter the gland along the hypophyseal stalk; and, secondly, by fibres arising in the superior cervical ganglion which pass to the gland by the perivascular route (mainly along the internal carotid artery). Roussy and Mosinger[1] have drawn attention to the possible significance of this double innervation in the control of pituitary secretion. It cannot be said that their paper has simplified the problem, for they have not taken into consideration questions of the first importance. It is possible that instead of active principles inactive precursors of these may be elaborated in the gland cells under the control of the hypothalamus or other endocrine glands. These principles may not be activated and thrown into the circulation until the necessary stimulus arrives over the second nervous pathway—that is, from the superior cervical ganglion. Recent work on the relations of the hypothalamus, pituitary gland, and superior cervical sympathetic ganglion in carbohydrate metabolism is capable of this interpretation, which, however, may not hold good for every hormone. In a recent paper on diabetes insipidus J. H. Biggart[2]

[1] *Presse méd.*, 1936, **79**, 1521.
[2] *Brain*, 1935, **58**, 86.

has drawn attention to cases of this disease in which the antidiuretic hormone was not effective when certain cellular elements in the hypothalamus were destroyed. These elements were not those which are supposed to control the formation of the antidiuretic hormone. Two possibilities present themselves. Either the antidiuretic hormone produces its effect through a nervous pathway to the kidney which begins in the hypothalamic nerve cells, or the hormone reaches the hypothalamus in an inactive form and is activated in these nerve cells. The former theory is unlikely as the antidiuretic hormone can act on a kidney deprived of its nerve supply. The second assumes that certain nerve cells of the hypothalamus have a function different from that of ordinary nerve cells and are not far removed from secretory cells. The histological appearances of these cells tend to support this hypothesis. The interest of this work lies in the suggestion that the brain may be more than a nervous mechanism and that it may contain in a certain region cells which have an " endocrine " function.

THE TRAFFIC IN NARCOTIC DRUGS

There is a prospect that this year may see some progress made with the limitation of production of raw opium, in accordance with resolutions passed both by the Council and the Assembly of the League of Nations. The Advisory Committee on Opium and Other Dangerous Drugs is collecting information in reply to a circular issued to all Governments with a view to summoning two preliminary conferences as soon as these can be arranged. One of these will be composed of representatives of countries which produce raw opium for export, and the other of representatives of countries which export opium " prepared " for smoking, or which have monopolies for prepared opium. It is estimated that an average of 240 tons of raw opium are required annually for the legitimate manufacture of drugs, and some 300 tons are deemed to be required annually for making " prepared " opium for smoking. As against this 540 tons there is reason to believe that the annual world production of raw opium amounts to between 1,000 and 1,500 tons. The largest producer of the opium poppy is China ; the other opium-growing countries are Afghanistan, Bulgaria, Greece, India, Iran, Japan, Korea, Turkey, Soviet Russia, and Yugoslavia. As regards narcotic drugs the Supervisory Body set up by the Limitation Conference of 1931 has estimated the legitimate world requirements for the current year as follows: morphine (including that used for " conversion " into other drugs) 40,976 kg., heroin 965 kg., codeine 25,724 kg., dionine 3,199 kg., and cocaine 4,976 kg. These estimates of requirements are for all countries and territories of the world. In the case of sixty-one countries the figures were furnished by those countries and passed by the Supervisory Body. In the case of nine countries, from which no estimates were received, these were made by the Supervisory Body. Four of the nine were parties to the Limitation Convention—namely, Spain, Ecuador, Haiti, and Peru. The remaining five were: Argentine, Bolivia, Ethiopia, Liberia, and Paraguay. The number of countries furnishing the necessary estimates has risen from forty-five in 1933 to sixty-one in 1936. While the illicit trade in narcotics continues to be distressingly large, seizures of contraband are said to be fewer and of less amount, except in the case of cocaine and Indian hemp. It is believed that addicts unable to obtain morphine and heroin are using cocaine and Indian hemp in substitution. The Permanent Central Opium Board has drawn attention to the high rate of consumption of opium in Scandinavian countries ; in Iceland the rate per million inhabitants reached 191.30 kg. in 1935. The exceptionally high rate in India, 697.04 kg. in 1934 per million inhabitants, is attributed to the opium-eating practised in that country.

THE BLOCKED PULMONARY CAVITY

Two recent papers[1] [2] by Salkin, Cadden, and McIndoe advance our knowledge in regard to the pathology and clinical picture of tuberculous lung cavities. The authors carried out post-mortem bronchography in seventy cases, consisting of the injection soon after death of a solution of potassium iodide, barium sulphate, and milk, the dead person being seated in a specially constructed chair the back of which forms the casette holder. (Various other important points in the technique are described in the articles.) In thirty-seven of these cases a necropsy was performed ; and the investigation was completed by a clinical study of living patients. The authors were able to show that pulmonary cavities may exist without communication with the tracheo-bronchial tree (in 14 per cent. in their series), and that these may be of any size and with or without a fluid level. While thus " blocked " they may still give the physical signs of a cavity, and even enlarge ; they present the same gross and microscopical characters as cavities which do communicate with the bronchial tree. The blocking of the cavity may be due to extrabronchial fibrosis, to occlusion of the bronchial lumen by inflammation or by purulent plugs, or to filling up of the cavity with caseous debris. Thus blocking of the draining bronchus of a cavity does not cause its healing or the disappearance of the appropriate physical signs, nor does failure of lipiodol to enter a cavity mean that no cavity is present. The healing of a cavity is not a simple anatomical process ; it depends on the structure of its walls and that of the surrounding pulmonary tissue. The authors conclude that the prognosis of blocked cavities does not appear to differ from that of the open variety, and that collapse therapy should be given a trial except for those which, filled with caseous debris, become clinically inactive after inspissation and encapsulation. Salkin, Cadden, and McIndoe also found that only a small number of all cavities had dependent drainage ; most efferent bronchi arose from the upper parts of the cavity wall ; they therefore stress the importance of change of position and the need of postural drainage in order to place the draining bronchus in a dependent site, particularly for cavities showing a fluid level. Among other important points brought out by the authors by means of their technique are the following. The ease with which

[1] *Amer. Rev. Tuberc.*, 1936, **34**, 634.
[2] Ibid., 1936, **34**, 649.

the minimal air of the lung was replaced by the various solutions they used casts doubt upon the belief that air is entrapped by collapse of the smaller bronchi; rather is it probably associated with incomplete collapse resulting from damaged elastic fibres due to death. Absence of atelectasis in the presence of twelve blocks of major bronchi and numerous blocks of smaller bronchi, many of which were of long standing, lends support to the theory of interlobular air communications. Finally, the authors emphasize that repeated injections of lipiodol may be needed in suspected cases of bronchiectasis, since occasional entrapping of the air by their dye occurred, and that absence of alveolar filling may be found with dilated bronchi when the latter contain enough pus to produce occlusion.

HEALTH POLICY IN PALESTINE

The annual report for 1935 of the Department of Health in the Government of Palestine contains much interesting information. The general administrative policy of the Department has been one of decentralization, responsibility for medical and health affairs being vested as far as possible in the British senior medical officers in charge of the four medical divisions. Under their administrative control Palestinian medical officers carry out the routine work of hospitals and clinics, and also of sanitary measures. This policy has enabled the Department to concentrate its energies on the reduction of preventable diseases, the improvement of general sanitary and health conditions, and the medical supervision of school children and infant welfare work. Progress is hampered, however, by lack of adequate funds, and the allocations for special purposes are far too small, while it has not yet been possible to make any provision for tuberculosis. During the year under review there was an increase in the total incidence of malaria, attributable to an unusually heavy winter rainfall. As an example of the extent of antimalarial measures it is recorded that 169,228 potential mosquito breeding places were registered, and over 2,800,000 inspections were made. Oil was applied on 800,000 occasions, 330 pumps were fitted, and 9,300 places were mosquito-proofed. A number of extensive drainage schemes were also undertaken. Ankylostomiasis investigation has shown that the conditions of warmth, moisture, and soil associated with citrus cultivation are favourable to the development of the parasite. In the Jaffa district measures of sanitation and treatment carried out on a large scale only resulted in a 5 per cent. reduction of incidence. It is considered that the lack of sanitation in the orange groves themselves may to some extent be responsible for maintaining continuous reinfection among the labourers employed. There were 2,060 cases of typhoid with 204 deaths, a small increase on the figures for the previous year; 400 cases occurred in Haifa alone. Overcrowding is prevalent in the larger towns, and sanitary progress has been unable to keep pace with the increase in population. A disquieting feature is the continued penetration of the disease into rural areas, formerly comparatively free, as a result of cheap transport and the flow of labour into the towns from surrounding villages.

BACTERIAL ENDOCARDITIS

Although pathological and clinical researches have revealed much of the natural history of bacterial endocarditis, many problems concerning this mysterious disease still await solution. Dr. Bruce Perry in a recent monograph[1] traces our knowledge of this malady from one of the earliest clinical descriptions in 1707 to the present day. Much bacteriological work has been done on this disease, and the author has undertaken an analysis of a composite group of 1,000 cases. Streptococci were found to be responsible for 68 per cent., while the pneumococcus and staphylococcus were approximately of equal aetiological importance, with 11 per cent. and 10 per cent. respectively. The gonococcus and *H. influenzae* were together responsible for about 7 per cent. The clinical descriptions have been assembled from the author's experience, together with references to the more important series and cases from the literature. While so much knowledge has been accumulating in respect of aetiology, bacteriology, and the local and constitutional effects of the disease, it is disappointing that so little can profitably be said about treatment. For in spite of auto-haemotherapy and sera and vaccines and intravenous antiseptics the diagnosis of bacterial endocarditis implies the existence of a malady almost invariably fatal. Dr. Bruce Perry gives an up-to-date and readable survey of the subject.

CENTENARY OF LEOPOLD VON SCHRÖTTER

On January 30 the centenary of Professor von Schrötter will be celebrated by the University of Vienna and the Vienna Laryngological Society. Born on February 5, 1837, he was one of the pioneers of laryngology, and some of his researches and methods still hold. Schrötter was the founder of the department and the first professor of laryngology in the University of Vienna, which was the first special clinic in the world to be established with a chair in a university. He also took a particular interest in the modern campaign against tuberculosis. At Alland, near Vienna, he founded one of the first open-air sanatoria. At the celebrations at the end of this week a memorial medallion of Schrötter will be unveiled and the rector of the university (Professor Arzt), the dean of the faculty (Professor Kerl), Professor Sorgo (a former assistant), and Professor Marschik, the president of the Laryngological Society, will deliver addresses. Many of the senior laryngologists of this country will remember with affection this genial professor and his remarkable command of English. He last visited London during the Congress of Tuberculosis in 1901. He died in 1908 at a dramatic moment when he was presiding over the International Congress of Laryngology in Vienna.

Owing to reconstruction work at the Royal College of Surgeons of England it has been found necessary to close the Museum for an indefinite period. It is hoped, however, that it may be possible to reopen the Museum towards the middle of March.

[1] *Bacterial Endocarditis*. By C. Bruce Perry, M.D., M.R.C.P. Bristol: J. Wright and Sons. (10s. 6d.)

ENDOCRINES IN THEORY AND PRACTICE

This article is one of a series on Endocrinology contributed by invitation

PHYSIOLOGY OF THE ADRENAL GLAND

BY

S. LEVY SIMPSON, M.A., M.D., M.R.C.P.

The adrenal glands consist of two components, an outer cortex and an inner medulla, the former being derived from the mesoblastic urogenital ridge and the latter from the neural ectoderm in common with the sympathetic neurones. The main nerve supply is from the splanchnics, and the neural impulse is transmitted (somewhat paradoxically) by liberation of acetylcholine at the terminal ganglia (Feldberg and others). In the elasmobranch fishes—for example, shark—the cortex (interrenal body), and medulla (para-aortic chromaffin bodies) are quite separate; in reptiles they are in more intimate association; but it is only in the mammals that the cortex surrounds the enclosed medulla.

From without inwards the cortex consists of three zones—glomerulosa, fasciculata, and reticulosa. The inner portion of the latter is known as the pigment zone, the cells having an affinity for osmic acid. This may represent the involuted androgenic zone, which is concerned with sex and is very large in the foetus. The cortex is rich in lipoid-containing double refractile crystals. It secretes a hormone, cortin, which is essential for life. The cells of the medulla, as those of the para-aortic chromaffin bodies, have an affinity for chromic acid. The medulla secretes adrenaline, but is not essential for life.

Adrenaline

The essential secretory product of the medulla has the formula $C_9H_{13}O_3N$, dioxyphenylethanolmethylamine, and is related to tyrosine and the intermediate product dioxyphenylalanine (dopa). It is prepared by extraction of the mixed glands with dilute acids, removal of proteins by alcohol precipitation, evaporation of the alcohol, and precipitation of the free base by ammonia. It can also be obtained from the aortic preganglion of the foetus (Elliott) and from the para-aortic accessory chromophil tissue of dogs, guinea-pigs, and rats (Vincent and others). Nevertheless these tissues do not hypertrophy after adrenalectomy.

Adrenaline can be assayed colorimetrically (Folin, Cannon, and Denis) by its power to reduce tungstic acid to the blue oxide. The following biological methods are more sensitive and more specific, and are dependent upon the sympathomimetic action of adrenaline: (1) inhibition of an intestinal strip suspended in saline; (2) inhibition of a muscle strip of the uterus of non-pregnant cat; (3) vasopressor response in a spinal animal; (4) dilatation of denervated iris; (5) acceleration of denervated heart, etc. The rate of secretion of adrenaline was found by Stewart and Rogoff to be 0.00025 mg. per kilo of body weight per minute, using the "cava-pocket" method: veins entering the vena cava, excepting the adrenal veins, are clamped, so that a pocket can be formed by occluding the cava beneath the diaphragm and below the entrance of the adrenal veins. To obviate the influence of general anaesthesia Sataké and others produced anaesthesia by cutting the dorsal roots T9 to L3, and some months later took specimens of blood by syringe directly from the adrenal vein; biological assay then showed the output to be only 0.00007 mg. per kilo of body weight per minute.

Adrenaline acts after section of the sympathetic nerves but not after paralysis of the terminal fibres by apocodeine or ergotoxine. Its site of action is therefore the myo-neural junction (Langley). Previous nerve section, novocain, and thyroxine augment the sympathomimetic action of adrenaline. Ergotoxine paralyses vasoconstrictor fibres, and after its use adrenaline has a vasodilator and vasodepressor action instead of the normal vasoconstrictor and vasopressor action. Adrenaline produces acceleration and irregularity (with extrasystoles) of the heart with fatal dilatation. Particularly after chloroform is there a tendency to ventricular fibrillation. In moderate doses there is an increase in pulse rate, blood pressure, and cardiac output. The cerebral and pulmonary arteries may be slightly constricted but the coronaries are dilated. Respiration tends to become shallow and irregular, with periods of apnoea. The bronchioles are dilated, especially if previously in a state of spasm. The movements of the stomach are inhibited by injections of adrenaline, but when given by mouth jejunal colic occurs. Movements of the human pregnant uterus are inhibited (Bourne and Burn), but the cat's uterus is contracted if pregnant, relaxed if not. In the guinea-pig dilatation of the pupil and exophthalmos may result from adrenaline, but this effect is much more marked with ephedrine. This is also true of the pilomotor action. Sweating may be obscured by the accompanying vasoconstriction. The temperature and basal metabolic rate are increased. Coagulation time is diminished. Adrenaline produces contraction of smooth muscle—for example, spleen—and has an important influence on haemopoietic centres or depots. Thus an injection is followed by increase in the number of red cells, lymphocytes, leucocytes, and platelets.

Adrenaline and Carbohydrate Metabolism

Adrenaline accelerates glycogenolysis in both liver and muscle, thus increasing the blood sugar and the blood lactic acid. After hepatectomy only the lactic acid is increased. The hyperglycaemia and glycosuria that result from puncture of the floor of the fourth ventricle (Claude Bernard) are partly due to the release of adrenaline and partly to direct nervous transmission of the impulse to the liver. Denervation of the adrenals or cauterization of the medulla will diminish the severity of diabetes mellitus resulting from pancreatectomy. By cross-circulation experiments, acceleration of the denervated heart, increase of erythrocytes and leucocytes, and other methods, it can be proved that adrenaline is secreted during insulin hypoglycaemia. That there is normally an antagonism or balance between adrenaline and insulin secretion is further suggested by Cori's observation that the adrenaline effects on carbohydrate metabolism could all be obtained if adrenaline was injected at a rate and concentration no greater than that at which it is secreted in the anaesthetized animal.

Adrenaline and Cannon's Emergency Theory

Cannon has produced evidence (not undisputed) that "afferent stimulation, asphyxia, and emotional excitement cause a quick and abundant secretion of adrenaline." This would aid the organism in an emergency by in-

creasing the cardiac output, increasing metabolism, raising the blood-sugar concentration, diminishing fatigability of muscles, raising the oxygen-carrying power of the blood by increasing haemoglobin and red cells, and by diminishing the coagulation time of the blood. Such reactions might aid the primitive animal in flight or combat. Cannon and collaborators also showed, however, that neither the medulla nor the sympathetic nervous system was essential to life. Animals deprived of them were sensitive to cold, and their rage was not associated with hyperglycaemia or erection of hair.

Adrenalectomy

Since unilateral adrenalectomy, with destruction of the medulla of the remaining gland, has little or no effect on the health of the animal, a study of the results of bilateral adrenalectomy should give some indication of the function of the cortex. This supposition is further supported by the fact that adrenaline injections cannot influence the fatal outcome of the latter operation, whereas cortical extract can.

In some species, such as the cat and the dog, the operation is almost invariably fatal and usually within a week. In others, such as the rat, accessory suprarenals may prolong survival, sometimes indefinitely. With correct technique, including the removal of the periadrenal fat, there is nevertheless a 100 per cent. mortality in most strains if young rats weighing less than 100 grammes are used. The results are the same for one-stage or two-stage operations, but the latter may minimize acute fatalities from surgical trauma.

In the case of rats recovery from the operation may appear complete within one or two days, and superficially the operated rats may appear no different from the controls; nevertheless sudden collapse and death may take place within a few hours. Where the survival period is more prolonged, either spontaneously or with minute doses of cortical extract, the more definite results of cortical insufficiency can be studied. A loss of appetite and failure to gain weight adequately are early signs. If control rats are given daily an amount of food equal to that eaten by their paired adrenalectomized litter mates it is seen that with the latter there is also a deficient gain of weight per gramme of food intake (Levy Simpson, Dennison, and Korenchevsky). The animals are inert and apathetic, but hyperexcitable when interfered with. Their muscle tone is poor, and they are unable to climb the observer's hand when suspended. The fur is ruffled, dry, and lustreless. Infection of the eye and eyelids may be present. Diarrhoea and bloody stools occasionally occur, but are rare features except in the terminal phases. In the absence of cortin there is a susceptibility to nasal and respiratory affections. The rectal temperature is often subnormal, and even when normal falls very rapidly on exposure to cold, which the animals are unable to withstand. At necropsy there is a striking absence of abdominal fat, a hyperplasia of the thymus and lymphatic nodes, congestion of the viscera, haemorrhagic erosions of the gastro-intestinal tract, and other changes. The blood is thick and coagulation time diminished. In more chronic insufficiency in cats and dogs there may be a slaty-grey pigmentation of the skin and a chocolate-brown coloration of subcutaneous fat.

The Cortex and Carbohydrate Metabolism

The blood sugar after adrenalectomy falls acutely just before death and hypoglycaemic convulsions may occur. Apart from this terminal drop it may or may not be low, according to the species of animal. There is, however, a profound disturbance of carbohydrate metabolism, as shown by a decrease in muscle and liver glycogen, the latter being especially severe. Probably for this reason excitement, fright, or adrenaline will not produce the rise of blood sugar that occurs in normal animals. The adrenalectomized animals are also unable to synthesize glucose or lactic acid into hepatic glycogen. There is a high concentration of lactic acid in the blood. All these changes are corrected by a cortical extract. Britton and Silvette think that the regulation of carbohydrate metabolism is the most important function of the adrenal cortex.

The Cortex and Sex

There is strong clinical evidence in support of an association between the cortex and sex. Experimentally, hyperplasia occurs after castration in rats, during pregnancy in guinea-pigs, oestrus in frogs, and ovulation in pigeons. Adrenalectomy is followed by suppression or by irregular appearance of the oestrous cycle, and by degeneration and atrophy of the testis. It is not certain how far this is due to the general metabolic changes and poor condition of the animal, rather than to a specific influence. If the animals are kept in a more chronic state of insufficiency there is at first a hyperplasia (? compensatory) of the interstitial cells of ovary and testis, without any degeneration, but later on a gradual atrophy follows. The latter would appear to be an indirect effect through the pituitary, since adrenalectomy results in a diminished gonadotropic potency of the pituitary and a decrease in the proportion of its basophil cells. Pregnancy prolongs the survival period after adrenalectomy.

Injections of cortical extracts have given discordant results. Atwell produced enlargement of the ovaries in hypophysectomized frogs, and Corey and Britton precocious sexual maturity in young rats. The majority of experimenters have obtained negative results with an extract which was quite potent in preserving the life of adrenalectomized animals. Reichstein, however, has isolated from the adrenal gland a crystalline steroid, adrenosterone, with male-hormone properties. In adrenal virilism comb-growth hormone may be present in excess, and in adrenal feminization oestrogenic hormone may be present in excess. Callow and Parkes have obtained adrenal extracts that show oestrone-like and progesterone-like activity.

It is important to remember that in the adrenal of the human foetus and of some young animals there exists a large zone between the cortex and medulla which is called the androgenic zone, because of a probable relation to the gonads. Thus in the mouse this zone disappears at puberty and in the male adult mouse hypertrophies after castration (Howard, Deanesly). It also involutes in the female mouse during pregnancy. The presence of this zone has not been observed in the dog, cat, rabbit, or cow. In man it involutes rapidly after birth, and it is postulated (Grollman) that the cells of the rudimentary androgenic zone are the ones that undergo hyperplasia in virilism and pseudohermaphroditism.

The Cortex and Mineral Metabolism

An important function of the adrenal cortex is the regulation of the balance and excretion of sodium and chloride. Adrenalectomy results in an increased excretion of these two elements and a fall in their serum values. There may be an initial diuresis and subsequent oliguria, but the water excretion is insufficient to account for the degree of haemo-concentration as manifested by a rise in total solids, haemoglobin, and plasma proteins.

Evidence is in favour of an increase in the extracellular fluid of the body (and to a less extent even intracellular fluid), and the liver and muscles have been found to be hydrated. In more severe adrenal insufficiency there is a rise in the serum potassium. This appears to be a direct result of the abnormal loss of sodium, since the administration of this element will cause a fall of serum potassium to normal. All these changes in mineral and water metabolism, in the adrenalectomized animal, can be prevented or remedied by the administration of adequate amounts of cortical extract. Swingle and others found that "sodium chloride and water cannot be regarded as an effective substitute for the cortical hormone in the bilaterally adrenalectomized dog, since it was necessary to inject cortical extract in order to save the animals when they sooner or later developed severe symptoms." Harrop and others, however, have kept adrenalectomized dogs alive for 150 days with mixtures of sodium chloride, bicarbonate, lactate, etc.

The rise of blood urea and non-protein nitrogen and the negative nitrogen balance that occurs after adrenalectomy are partly, if not entirely, secondary to the disturbance of electrolytic balance and diminished osmotic pressure, since these changes tend to be abolished by the administration of sodium chloride in adequate dosage. McCance produced similar changes in man, as well as many features of Addison's disease, by experimental salt deprivation, but there was no rise in serum potassium. A diet low in potassium will prolong the survival of adrenalectomized animals, and, conversely, a high potassium diet will precipitate death or necessitate a higher dosage of salt and/or cortical extract.

That the disturbance of sodium balance is not the essential feature in all species is suggested by the observations of Silvette and Britton on the adrenalectomized marmot, in which a fatal outcome was associated with the characteristic disturbance of carbohydrate metabolism but a serum sodium above normal level. Jimenez-Diaz believes that the changes in mineral metabolism are secondary to the acidosis resulting from diminished ammonia formation by a poorly functioning kidney.

Other Changes following Adrenalectomy

Apart from the relative polycythaemia (anhydraemia) there are other important changes in the blood picture—namely, a considerable reduction in the percentage of polymorphonuclear cells as well as a diminution in the total leucocyte count. Analogy with agranulocytosis has been suggested. The blood pressure may be maintained at normal level until the terminal crisis, but in some species a subnormal pressure characterizes more chronic adrenal insufficiency.

The rise in blood urea and inorganic sulphate may be partly due to disturbed mineral balance and partly to circulatory disturbance, but changes in the kidneys have also been recorded. Banting and Gains observed nephritic changes in dogs, and Levy Simpson and Korenchevsky recorded tubular degeneration in rats killed during chronic adrenal insufficiency. Marshall and Davis found a failure of renal function in cats before other symptoms occurred, and postulated a suprarenal hormone regulating renal function. The basal metabolism is usually normal until the terminal phase, when there is an acute fall. There may be an impairment of absorption of fat from the intestine. The blood cholesterol may be raised in some species after adrenalectomy. There is a hypersensitivity to foreign proteins (allergy), histamine, narcotics and other drugs, toxins, and bacterial infection. Gonadotropic hormone may stimulate the sex organs and pituitary growth hormone may increase the deficient rate of growth, but neither prolongs survival.

Adrenal Glands and Infection

Elliott showed that the cortical lipoid vanishes with great rapidity in all acute febrile conditions. Haemorrhage and necrosis of the adrenal cortex is characteristic of experimental infection, especially with *B. diphtheriae*. Cortical extract combined with ascorbic acid is said to protect a guinea-pig from what would otherwise be a fatal dose of a broth culture of *B. diphtheriae*. Caldarera found that the bactericidal power of the blood of the rabbit against several organisms is increased by cortical extract. The medulla may play some part since there is an increased output of adrenaline during infection, and a virulent culture of pneumococci can be rendered avirulent by treatment with adrenaline. Adrenalectomized animals are susceptible to infection and toxins.

Adrenals and Vitamin C

The adrenal gland has a high content of ascorbic acid (vitamin C), the cortex having about thrice, and the medulla about twice, the potency of fresh orange juice. This vitamin is also present in large quantities in the pituitary gland and the liver. Pure preparations of cortical extract, potent in maintaining adrenalectomized animals, do not contain vitamin C, and, conversely, this hormone cannot prolong survival after adrenalectomy. Some animal experiments suggest that the addition of vitamin C to cortical extract increases its protective action against *B. diphtheriae*. Hypertrophy and degeneration of the cortex results from experimental vitamin deficiency (A, B, and C). *In vitro* ascorbic acid inhibits the formation of melanoid pigment from adrenaline or dioxyphenylalanine.

Preparation and Standardization of Cortical Extract

According to Swingle and Pfiffner "the suprarenal glands (beef) packed in ice are received from the slaughterhouse within twenty-four hours after the death of the animals, and the cortex dissected as free as possible from extraneous fat and medullary tissue, ground, and extracted with 95 per cent. and 80 per cent. ethyl alcohol for three or four days. Extract with benzene. Remove benzene *in vacuo*. Then distribute between 70 per cent. ethyl alcohol and petroleum ether. Latter removed by distillation. Wash, concentrate *in vacuo*; add water to desired volume." Grollman uses a method based on the adsorption of the cortical hormone by charcoal from neutral aqueous solution. Prepared in this latter way cortical extract is said to be active even when given by mouth. As usually prepared, however, it is administered parenterally and loses the greater part of its activity if given orally.

The following methods have been used for assay of cortical extract and are all based on its influence after adrenalectomy: (1) survival of dogs, cats, or rats; (2) growth rate of rats; (3) response of rat gastrocnemius muscle to electrical stimulus; (4) resistance to histamine or narcotic drugs; and (5) maintenance of normal blood urea in dogs. The "dog unit" is defined as the minimum daily dose of an extract per kilogram of body weight necessary to prevent an increase in blood urea after adrenalectomy. No one method gives constant results, and different methods are not strictly comparable. Extracts are therefore usually labelled "30 grammes of cortex per 1 c.cm. of extract." It is hoped that the isolation and synthesis of a crystalline product will be found possible and thus constitute a basis for standardization.

Kendall has prepared a crystalline product, and de Fremery, Laqueur, Reichstein, Spanhoff, and Nyldert have just announced the separation of very active crystals.

The maintenance dose of cortical extract, as usually prepared, for different species is approximately: rats 1/2 to 1 c.cm.; dogs 1 to 2 c.cm.; cats 2 to 3 c.cm.; and monkeys 6 to 12 c.cm.

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Nova et Vetera

MEDICAL HISTORY OF LIVERPOOL

The late Mr. Thomas H. Bickerton was well qualified to write the medical history of Liverpool. He had an ancestral connexion with the city and was one of its leading ophthalmic surgeons. As early as March 3, 1904, he read a paper on the Liverpool Medical Institution, and on October 7, 1909, he gave an inaugural address on Dr. John Rutter. During the rest of his life he continued to collect data for a more general medical history of Liverpool. The results were reduced to book form by Miss May McKisack, B.Litt. It is now issued after revision by Dr. R. M. B. Mackenna, who is in charge of the dermatological department of the Southern Hospital. The resulting volume[1] would have gladdened the heart of Mr. Bickerton could he have lived to see the outcome of his work—a stately quarto of 313 pages, well printed on good paper, lavishly illustrated with maps, plans, and portraits, and at the moderate price of twenty-one shillings.

The story begins with the building of the Infirmary in 1749 and is continued until 1920. It tells of the formation of the dispensary (1778), the Hospital for the Blind (1796), the fever hospital (1801), the Northern Hospital (1833), and the Royal Southern Hospital in 1841. A noble record of voluntary charity in a city growing in size and in wealth. At first every medical man practised every branch of his profession, but specialism crept in, eyes and ears first, then throats, skins, children, and finally *x* rays, which seem to have attracted attention in Liverpool within a few months of their discovery.

Some Outstanding Names

Many names of the physicians and surgeons are well known: Thomas Robinson, said to be an M.D. of Oxford, but of whom there is only the bare university record that he matriculated from Brasenose, at the age of 20, on May 2, 1741; Park and Manson, surgeons in advance of their time; Rutter and Bostock; the Bickersteths; T. H. Waters; Richard Caton, physician, archaeologist, and lord mayor; Mitchell Banks, Reginald Harrison, and F. T. Paul, great surgeons. The Thomases, father and son, and Sir Robert Jones all added lustre in their day to the medical circles in Liverpool. From the beginning the Liverpool physicians took an active interest in furthering the interests of the profession through the British Medical Association. We read that in 1832, when the Provincial Medical and Surgical Association—the precursor of the British Medical Association—was formed, four distinguished medical men were on the Council, and no fewer than sixteen essays and cases were contributed to the first volume of *Transactions* by Liverpool practitioners. The Association itself has held four of its Annual Meetings in the city, and the names of Dr. A. T. K. Waters and Sir James Barr will long be remembered as those who did yeoman service in its interests.

Medical Education in Liverpool

The teaching of medicine has always been a strong point at Liverpool: clinical material has been abundant, because it is a seaport with a large migratory population. Long before the School of Medicine was opened in 1834 there were two Schools of Anatomy, with an attendance of about forty medical students, sculptors, and artists. Subjects appear to have been so plentiful that in October, 1826, three casks labelled "Bitter salts" consigned to a firm in Edinburgh were found to contain eleven dead bodies partially salted and pickled. The private schools of medicine were absorbed by the School of Medicine attached to the Infirmary. This became a faculty, first of University College, then of the Victoria University, and finally of the University of Liverpool. Side by side with it was the University School of Hygiene and the much-needed School of Tropical Medicine, which has done magnificent work in connexion with our Dominions in the Tropics.

There is an interesting chapter on the development of nursing from the time when it was proposed to secure the services of a better type of nurse at the Infirmary by raising the salary from £10 to £16 a year. The matron reported that she only had four nurses whom she could trust not to celebrate such a rise in prosperity by getting drunk on quarter day. There is, too, a terrible picture of the sanitary condition of the city even as late as 1871, when Professor Parkes of Netley and Professor J. Burdon-Sanderson of University College, London, reported that every cellar dwelling should have at least a window and access to a water supply and sanitary conveniences. As lately as 1895 some 26,000 people were still living in cellars.

A Forgotten Classic

Dr. David Waldie, we read, was a native of Linlithgow, and obtained the diploma of the Royal College of Surgeons of Edinburgh in 1831. He practised for a time in Liverpool as a surgeon and apothecary, but, being interested in chemistry, gave up medicine, became chemist to the Liverpool Apothecaries' Hall, and later settled in India, where he established a chemical works in Calcutta, and died in 1889. His claim to remembrance is that he introduced (Sir) James Y. Simpson to chloroform as an anaesthetic, having already tried its effects upon himself and his friend Dr. Abraham. His paper is a classic, and has long been hidden, for it was read on November 19, 1847, at a meeting of the Literary and Philosophical Society of Liverpool.

The book ends with serviceable tables of names and dates, and there is a sufficient index. It may be looked upon as a valuable contribution to medical history, and so far as can be tested it is accurate.

D'A. P.

[1] *A Medical History of Liverpool from the Earliest Days to the Year 1920.* From the data collected by the late Thomas H. Bickerton, Ch.M., F.R.C.S. London: John Murray. (21s.)

A report of Mr. Walter Howarth's Semon lecture on "Some Tumours and Ulcers of the Palate and Fauces" appeared in our issue of November 14, 1936 (p. 988). The full text of the lecture, with illustrations (many of them reproduced in colour), is published in the January issue of the *Journal of Laryngology and Otology*.

ONE HUNDRED AND FIFTH ANNUAL MEETING
OF THE

BRITISH MEDICAL ASSOCIATION
BELFAST, 1937

THE one hundred and fifth Annual Meeting of the British Medical Association will be held in Belfast next summer under the Presidency of Professor R. J. Johnstone, B.A., M.B., F.R.C.S., F.C.O.G., M.P., consulting surgeon, Royal Maternity Hospital, gynaecologist to the Royal Victoria Hospital, and professor of gynaecology, Queen's University, Belfast; he will deliver his address to the Association on the evening of Tuesday, July 20. The Sectional Meetings for scientific and clinical work will be held on Wednesday, Thursday, and Friday, July 21, 22, and 23, the morning sessions being given up to discussions and the reading of papers. The Annual Representative Meeting for the transaction of medico-political business will begin on the previous Friday, July 16. The names of the seventeen Scientific Sections and their Presidents were printed in the *Supplement* of December 19, 1936. The full list of officers of Sections, the provisional programme and time-table, list of hotels, etc., and other details of the arrangements for the Annual Meeting will appear in later issues. We publish below the first of a series of articles on the City of Belfast and its University and medical institutions.

BELFAST—THE GATEWAY TO ULSTER

It was at Saul, near Downpatrick, that Saint Patrick first landed in Ireland (A.D. 432); John de Courcy came with an English army in 1171 and was created Earl of Ulster by Henry II; King John visited Ulster in 1210, and in 1315 Edward Bruce invaded the country and was followed by his brother King Robert Bruce, and they almost destroyed the Anglo-Norman colony in Ulster. William III took Ulster as his base to drive James II out of Ireland. For these invaders Carrickfergus, on the Antrim shore of Belfast Lough, was then the usual landing-place and Carrickfergus Castle the fortress of importance.

To-day the gateway to Ulster is through the modern city of Belfast. Few cities have so attractive an approach as the voyage up Belfast Lough presents, particularly in the early morning. The cross-channel steamer, after passing the towns and villages along the coast of Down, swings round at the Copeland Islands and enters Belfast Lough with the shore of Down on the port side and that of Antrim on the starboard, a distance of seven miles separating them. The coast-lines are different, but each is typical of its county—Down of the gentle grassy slopes; Antrim, rugged, volcanic, and austere. As the steamer passes along this impressive waterway leaving Bangor, Holywood, Whitehead, and Carrickfergus behind, the lough narrows, the shipyards come in sight, and the outlines of the city take shape. There is an atmosphere of shelter and seclusion about this approach to an industrial city, somewhat suggestive of the safe anchorage so widely known to be provided to ships by Belfast Lough. Presently speed is reduced, the steamer gently glides alongside Donegal Quay, and the visitor is free to set foot in a country full of distinctive charm, famous for its wealth of natural beauty and noted for the traditional hospitality of its people.

The People of Ulster

The people of Ulster are in many respects unique. They have an individual character, the result of the different strains which have been added to the original stock at various periods of history. To the basic Irish temperament has been added the blood of the Normans in the twelfth century, and in even earlier legendary times there was much intercourse with Scotland whereby Northern Ireland and Scotland easily exchanged inhabitants. Elizabeth settled West-countrymen here, and James I, in the Plantation of Ulster, after the "flight of the Earls," gave their confiscated lands to settlers who came mainly from the Scottish lowlands. The order of baronets was instituted by James, and admission to this hereditary order of knighthood was paid for in hard cash, the sums thus accumulated being earmarked for the expenses of the plantation. Every baronet, whether of old or recent creation, still bears in his coat of arms the Red Hand of Ulster. The Revocation of the Edict of Nantes in 1685 drove half a million Huguenots out of France, and many thousands of them settled in and around Belfast. Their descendants are to be found here to this day, so that the modern Ulsterman is a mixture of many bloods—Celtic, Norman, Scotch, French, and English—and the variables in character sometimes make an attractive individual, always an industrious member of the community, and at the same time a "distinct type, independent, sturdy, pushful, and above all determined." Many tributes have been paid to the Ulster character by kings, statesmen, publicists, and politicians, but the late Lord Rosebery's is most often quoted: "I love Highlanders, I love Lowlanders, but when I come to the branch of our race which has been grafted on to the Ulster stem, I take off my hat with veneration and with awe. They are, I believe, without exception the most irresistible race that exists in the universe at this moment."

Much of the art and craft of settlers still persists throughout the country, and their speech, manners, and names; the fine work of the linen workers is the heritage of the Huguenots, and many of the old French names have survived; the speech of Elizabeth and of Shakespeare is in ordinary use in the country districts, and much of the Ulster dialect and pronunciation and use of words is but a retention of the Elizabethan speech. Names such as Crommelin and de Lacherois are still to be found in the directories, and words such as "servant," "steal," and "gold" have still the Elizabethan pronunciation of "sarvint," "stale," and "goold" in the country.

The Capital City

So the visitor arrives in Belfast, the capital city of Northern Ireland. A glance at a map shows that it is situated in the natural junction of the necessary communications between the counties of Antrim and Down, with an excellent outlet to the sea; but Belfast is essentially a product of modern industrialism during the last 150 to 200 years. Carrickfergus, ten miles from Belfast on the Antrim shore of Belfast Lough (which used to be called Carrickfergus Bay) was for centuries the important community of North-East Ulster. Carrickfergus is noted for its castle built by John de Courcy in 1171, the square keep being a prominent landmark for miles around. This is a very perfect example of the Norman type of military stronghold and is one of the noblest examples of that time extant in Ireland. When Carrickfergus was at its zenith Belfast was but a village of a few houses at the ford of the river (bel, town; fearst, ford—"the town of the ford"). After the "flight of the Earls" came the English and Scottish settlers, among them a Devonian, Arthur

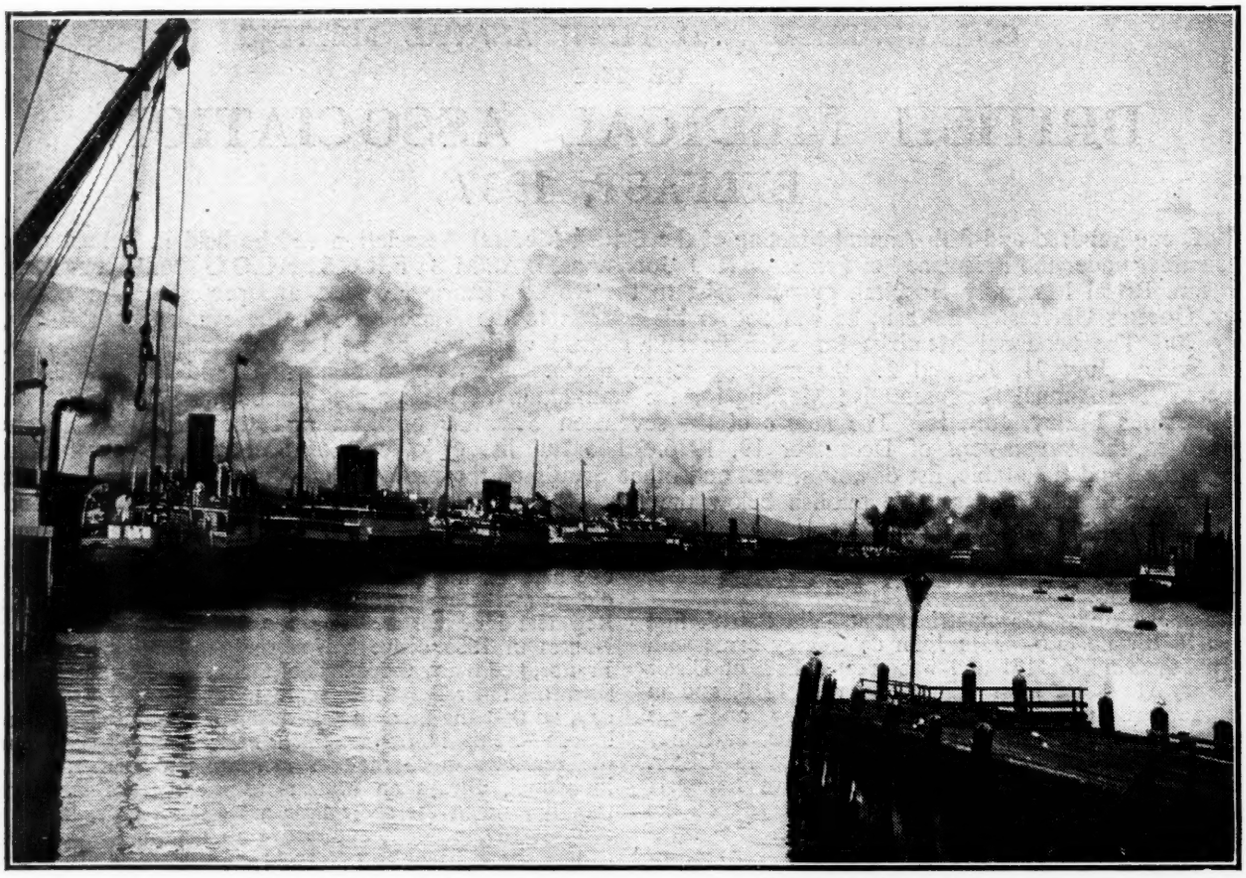

FIG. 1.—Belfast Harbour. Cross-Channel steamers. (*Photo: Baird, Belfast.*)

Chichester (1603), who was given the lands of Belfast. These he accepted and retained, as he was also Governor of Carrickfergus and received a life pension of 13s. 4d. a day. It is on record that he wrote of his newly acquired lands: "When I have them in perfection I will gladly sell the whole lands for £5 fee simple." The rateable value of the City of Belfast to-day is just less than £3,000,000.

Determination to overcome obstacles and a shrewdness in business, combined with opportunism on the part of its citizens, account in some measure for Belfast's present industrial position. There is an absence of raw materials in the hinterland of the city, and almost all have to be imported, including flax, steel, iron, coal, tobacco, and timber. In spite of these inherent disadvantages shipbuilding, engineering, linen weaving, rope making, and tobacco manufacture are all firmly established industries and are largely responsible for Belfast's position as the sixth largest port in the United Kingdom and the eighth city in the British Isles. Large areas of the city near the river are built upon silt: the harbour and docks have been recovered from the slob-land at the mouth of the River Lagan. Thus it has come that a hive of industrial activity has arisen in an area which owes comparatively little to Nature but a great deal to the character of the inhabitants in making existing conditions meet the needs of the moment and anticipate the chances of the future.

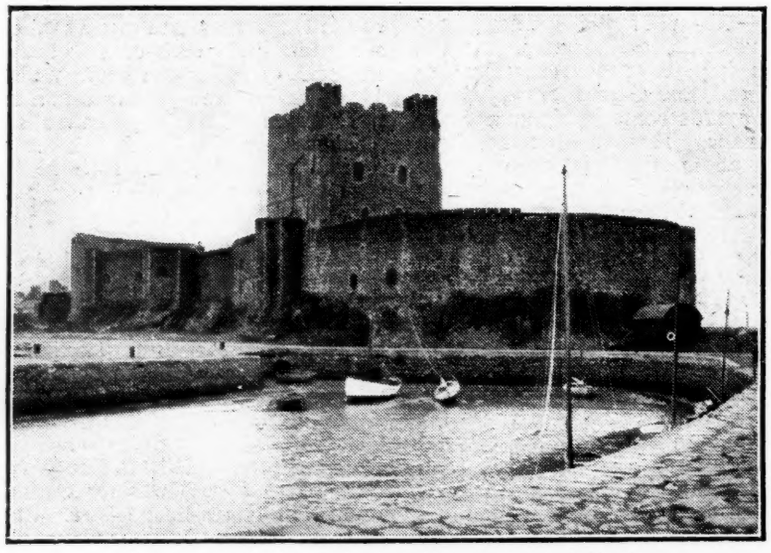

FIG. 2.—Carrickfergus Castle. (*Photo: Baird, Belfast.*)

At the restoration of the Monarchy in England in 1660 Belfast consisted of five streets and five lanes, and even when George IV ascended the Throne in 1820 the town consisted of but 2,000 houses, most of which were thatched. When the British Medical Association first visited Belfast in 1884 the population was 220,000; in 1909, on the occasion of the second visit, there were 380,000 inhabitants. To-day Belfast is the capital city of Northern Ireland, the seat of Government of the Six Counties area, possesses its own Parliament buildings, Royal Courts of Justice, City Hall, Queen's University, Art Gallery, and other imposing public buildings; the city has grown to dimensions and achieved a status far in advance of anything conceived of 100 years ago. The present population is nearly half a million, and the city covers twenty-three square miles.

The Linen Industry

The linen industry has for long been one of the staple trades of Ulster, but authentic history as to its origin is not easily obtainable. It was probably not of much importance until encouraged by the Norman settlers, but it is known that Walter de Burgo, Earl of Ulster (1254), had linen for his household use which was woven in Newtownards, Co. Down. The credit of the art and craft of fine linen manufacture, however, must be given to the Huguenots, who fled from France after the Revocation of the Edict of Nantes (1685), as they introduced the spinning wheel, and their finer methods of working had a far-reaching influence upon linen manufacture. Ulster's supremacy in fine linen work remains to this day, and has enabled the industry to maintain itself in the past against the jealousy of the English woollen manufacturer, the mechanization of cotton looms, and the handicap to-day of high tariff barriers in foreign countries. Early manufacture was entirely by hand looms, and various villages throughout the countryside formed communities of industrious craftsmen and women.

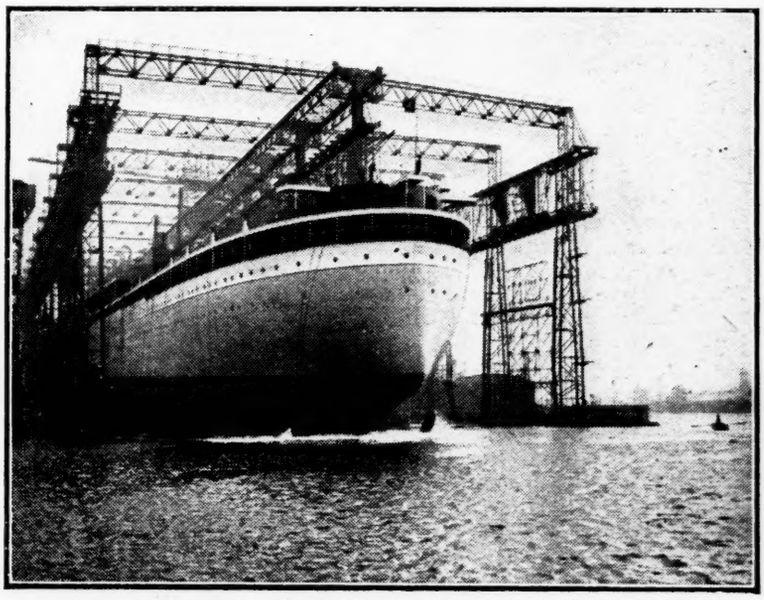

FIG. 3.—Launch of *Athlone Castle*. Messrs. Harland and Wolffs. (*Photo: Baird, Belfast.*)

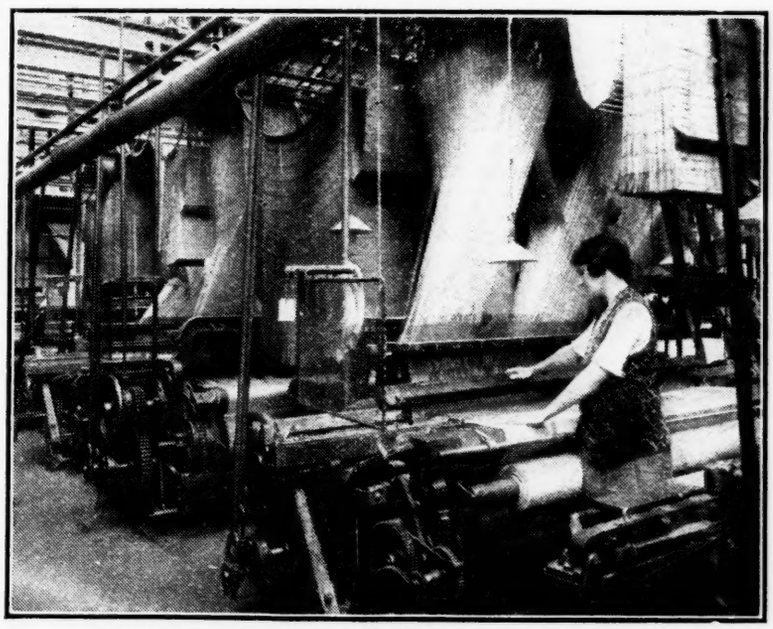

FIG. 4.—Damask weaving in Belfast. (*Photo: Baird, Belfast.*)

With the introduction of steam power a revolution occurred, and the first spinning mill worked by steam was built in 1828 by James Murland at Annesborough, Co. Down; in 1830 Messrs. Mulholland set up 1,000 spindles in Francis Street, Belfast, and shortly afterwards a further 8,000 in York Street, Belfast. This last enterprise developed into the York Street Flax Spinning and Weaving Company, Ltd., which now has 57,150 spindles at work and carries on all the operations incidental to the production of linen on a huge scale.

The outbreak of the American Civil War interfered with the supplies of cotton throughout the world; householders had to use linen, and this resulted in a boom in the trade with the consolidation of the position of Belfast as the centre of the linen industry. To-day Northern Ireland is the seat of a highly organized industry dealing with flax in all its stages from its retting, scutching, spinning, and weaving, and when the trade is working full capacity it employs upwards of 90,000 workers. Only a small proportion of the flax used is grown in Ireland, because the cultivation of the crop makes a very severe drain upon the riches of the soil, but intensive research is being continuously carried on by a Government department to improve the yield of flax and make it a profitable crop. His late Majesty King George V was much interested in this development and grew flax on his Sandringham estates from seed specially produced in the Northern Ireland Research Institute, which was eventually woven into fine linen in Belfast.

Fields of ripening flax will be seen in July, looking like half-grown corn but with a delicate blue flower. The crop is pulled by hand (a laborious job), tied into bundles, and "retted" in pools of still water for some days to allow the woody fibre to rot. The bundles of flax are then removed and spread out to dry, the "flax water" indicating its presence by a peculiar smell which, when once recognized, will not soon be forgotten. The dried fibre is then taken to a scutch mill, where it is subjected to a process of rough combining whereby the woody matter is removed and the flax fibre is saved. This is spun into yarn in the spinning mill and passed on to the weaving factories, where the beautiful products are woven into long strips of natural linen. For household use the linen is bleached by sunlight in the fields—a process which demands a moist atmosphere; this combination of sunshine and shower is a feature of the Ulster climate and makes it peculiarly fitted for the process. None of the chemical bleaching processes can approach in their results the softness, whiteness, and durability of the naturally bleached fabric, which is justly world-famous and is universally admired and desired. The natural unbleached linen finds a field of usefulness in the demands of aircraft manufacturers, and during the great war the bulk of the linen used by the Allied Air Forces was produced in the factories of Northern Ireland.

Shipbuilding

The history of Belfast shipbuilding starts in 1636, when the *Eagle's Wing*, a vessel of 150 tons, was built for

Presbyterian clergymen of the district to carry their persecuted people across the Atlantic and to help found and inhabit the New America. Three hundred years later Belfast is still associated with the transatlantic trade and is noted for the building of ocean liners which traverse the seven seas. During the seventeenth and eighteenth centuries many ships were built, all of them, of course, of wood, but up till 1833 the largest vessel was the *Hirdoo*, of 440 tons. The pay-roll of the yard was but a score or so of hands, and the industry was all but moribund when Edward Harland was taken into Hickson's firm in 1858. Two years later Gustavus Wolff joined Harland and so was inaugurated the firm of Harland and Wolff by two young men, both of them under 30 years of age. Together they built up the great reputation for first-class workmanship and design in ocean steamers which Belfast enjoys to this day. In later years the firm was joined by W. J. Pirrie (later Viscount Pirrie), who contributed a business ability and perspicuity which stamped him as one of the foremost industrialists of his generation. Ships have been supplied to many famous lines, the White Star, Union Castle, P. & O., Royal Mail, Pacific Steam Navigation Co., amongst others, and during and since the war numerous Admiralty contracts have been fulfilled. The pay-roll has risen from twenty-three to just under 20,000 on full employment; the company has supplied seventy-eight ships (sail and steam) to the White Star Line alone, of a tonnage of 1,300,000; in 1914 there was launched from its yard the largest output of any shipbuilding firm in one year, 156,000 tons; in 1935 this one firm launched one-fifth of the total ships built in the United Kingdom in that year. Many famous ships are associated with Harland and Wolff's: *Olympic, Titanic, Laurentic* (pre-war), *Georgic, Britannic, Reino del Pacifico, Asturias, Alcantara, Almanzora* (which is to be used for the special B.M.A. cruise to Belfast this year), *Athlone Castle, Stirling Castle* of recent years. During the war H.M.S. *Glorious* and H.M.S. *Vindictive* were built, and the new cruisers H.M.S. *Penelope* and H.M.S. *Belfast* have been delivered or are in the process of building.

Tobacco Manufacture

Belfast is also proud of its tobacco industry, and it is worthy of note that the familiar roll tobacco so popular in industrial England and throughout the world was originally manufactured here, and continues to be one of the important branches of the industry. Modern habit has popularized the cigarette, and the machines in use in Messrs. Gallaher's factory are the finest examples of mechanical ingenuity one can find in daily use, working with a delicacy and precision which is entrancing to watch and delightful to contemplate, and which is certain to appeal to all who are fortunate in being able to visit the works. In 1850 there were fourteen small firms producing tobacco in various forms, but scientific specialization eliminated all but two (Murray's and Milligan's). In 1863 Thomas Gallaher made his appearance in Belfast from his native Derry, and he strode from success to success by virtue of his practical business mind and general ability. In 1896 he acquired twelve acres of ground upon which is constructed the huge modern tobacco factory employing 3,000 hands. Further extensions have been made recently and enormous bonded warehouses covering thirteen acres have been added. As an indication of the commercial and manufacturing importance of the firm of Gallaher's it may be stated that they pay £5,000,000 annually in duty, and a stock of 30,000,000 lb. of leaf tobacco is usually in bond.

Rope Making

The rope-making industry is comparatively modern, dating from 1876, when fifty employees of the Belfast Ropeworks Company produced 500 tons of goods annually. Now 3,000 workpeople handle the raw materials from many foreign countries, and the company exports 13,000 tons of goods annually to all parts of the world. Every imaginable variety of cord and rope from finest twines to huge marine hawsers are to be seen in process of manufacture. The finest fishing nets and the heavy trawls are produced in this factory, and the visitor will be fascinated to watch the elaborate ingenious machines which wind balls of string, plait ropes, and form bundles of binder twine to be used in the prairies of North America and the wheat farms of Australia and New Zealand.

Other Industries

The distilling of whisky was known from early Christian times. It is on record that Strongbow, Earl of Pembroke, invaded the country in 1169 and found the local "usquebaugh" much more suited to the needs of the people than ale. Pot stilling was the usual method of manufacture until the introduction of the Coffey still, by which a blander product resulted. Since the war the demands of the Excise have extinguished the activities of most of the distilleries in Northern Ireland, but whisky drinkers still respect the names and still buy the products of Dunville's, Bushmills, and Comber.

Engineering is an important industry, and there are several works which specialize in certain types of machinery. These include exhaust fans, extractors, etc., many of which have been evolved to meet the needs of industries located in the area. In the various processes connected with the flax yarns the factories are equipped with mammoth extractor plants to remove dust, which is deleterious to the health of the operatives, and these have been supplied to hundreds of factories throughout the world, most of whom know the famous Sirocco fan.

Aerated waters manufactured in Belfast have a world-wide distribution. The famous Cromac Springs not far from the city centre are especially suited for producing a high-grade commodity.

It is interesting to note that felt was originally made by a medical man and that Belfast exports several thousand tons annually.

This is a by no means complete account of the activities of the City of Belfast and the neighbouring counties, but it will serve to indicate the main industrial features. The reader will appreciate the claim that the citizens have overcome many difficulties in establishing a prosperous community in modern times. It is admitted that there is nothing "ancient" as history goes, that learned scholars did not frequent antiquated inns, nor did distinguished alumni of an ancient university wander midst dark and narrow closes. Belfast is a modern city of broad straight streets and new buildings; its citizens have a deep sense of public duty and are jealous to preserve its high place among the cities of the Empire. Thus will they continue to exemplify the city motto—"Pro tanto quid retribuamus."

M. Pirolli (*Policlinico*, December 14, 1936, p. 2253) states that while intestinal tuberculosis represents the most frequent complication of pulmonary tuberculosis, the estimate of its frequency ranges from 25 per cent. according to clinical statistics to 50 and 90 per cent. according to the pathological findings of Gants and Kaufmann respectively. There is no doubt that many cases escape recognition owing to the intestinal lesions not being accompanied by definite clinical symptoms. Pirolli has recently investigated the behaviour of faecal catalase in all the cases of diarrhoea in subjects of pulmonary tuberculosis which have come under his observation, with the following result. The amount of catalase is distinctly increased in all the cases of diarrhoea in pulmonary tuberculosis, while in the so-called functional diarrhoea, due to other causes, the increase of the enzyme is only very moderate. Owing to the readiness and simplicity of the investigation, he recommends that a search for intestinal catalase should be made in all cases of tuberculosis before undertaking treatment by pneumoperitoneum.

Reports of Societies

INDIVIDUAL PSYCHOLOGY

At the annual dinner of the Medical Society of Individual Psychology on January 14, the chairman, Dr. C. M. BEVAN BROWN, presiding, Dr. J. D. REES, director of the Institute of Medical Psychology, congratulated the society on the work it was doing to make psychological principles and methods intelligible not only to general medical practitioners but to lawyers, clergy, and others whose work depended for its efficiency on an understanding of psychology. Dr. BEVAN BROWN said that those responsible for the work of the society recognized the need for simplification, at any rate, in relation to the groups referred to. Psychology touched all branches of medicine. It was difficult to evangelize the ordinary doctor, whose daily tasks involved a highly critical faculty which made him perhaps unduly sceptical of novelty, but the real fault was in the inadequate teaching of psychology during his training.

Mr. CLAUD MULLINS, metropolitan police magistrate, said that although without detailed knowledge of medical psychology he could testify as to its value. So far he had never had anyone back before him for a second offence who had received psychotherapeutic treatment. He asked medical psychologists to recognize certain essentials if their work was to be recognized. The law received no scientific medical or psychological training; it was necessary, therefore, that the reports on such matters to which they were asked to give attention should be presented in terms of clarity, simplicity, and common sense. Mr. Mullins also referred to the need for an alteration in routine procedure in the courts in dealing with a child, the victim of assault, who was required to give evidence in public. He thought that such evidence should be heard privately, though the jury should be present and the Press should not be excluded.

THE HOSPITAL STATISTICIAN

Two hospital statisticians, Mr. B. E. SPEAR and Mr. C. E. GOULD, gave to the Section of Epidemiology of the Royal Society of Medicine on January 22 some account of mechanical tabulation as carried out with hospital case records.

They described in particular the system adopted by the London County Council in regard to its general hospitals since 1930 and its special hospitals since 1931. By a system of coding and of punching with some rather complicated machinery it is possible to set out in a very small space on a single card a vast amount of information relating to a patient. The card has self-coding panels for age, marital condition, occupation, condition as to insurance, date of admission and discharge, reason for discharge, condition on leaving, and much other information. There are special cards for maternity cases, children, tuberculosis, the ambulance service, and other purposes. The special coding arrangements for indicating diseases are of a very complicated order. Diseases are divided into thirteen main groups, with up to twenty-four subdivisions in each group. It was stated that nearly 300,000 cards are turned out annually by the London county hospitals. The work of summarizing them is a very detailed and elaborate affair, but the whole value of the machinery lies, of course, in its practically unlimited scope for analysis. The application of mechanical tabulation, said Mr. Spear, placed a powerful aid in the hands of the investigator, and County Hall was supplied every year with a complete index of the principal diseases and complications treated in the hospitals controlled by the Council. The purposes served by the tabulation unit included annual returns to the Ministry of Health as to hospital patients and their costs, the Council's own annual returns for the hospital services, the ambulance statistics (there is a card for every street accident), quinquennial tables, and special investigations. Mr. Spear urged that it was unreasonable to suppose that the same person was likely to be an expert in medicine and in statistics. Medical training was directed to observation, while the statistician had nothing to do with observation, but with analysis. It might even be said that a good doctor was necessarily a bad statistician. Statistical investigation should precede and dictate policy.

General Discussion

Surgeon Captain S. F. DUDLEY, who presided, said that while he appreciated mechanical tabulation, he thought the statistician must also realize that the collection of data was the great weakness. The same case, for example, might be described by different medical men as one of influenza, tonsillitis, or pharyngitis. Therefore the statistician either himself needed to know a certain amount of medicine or else to be coached by a common-sense medical officer who was keenly aware of his own mistakes. Dr. W. A. DALEY said that devices for mechanical tabulation were not new in the public health service. He remembered the system fifteen years ago at the tuberculosis dispensary in Birmingham. He believed the Glasgow Corporation was the next to take it up, and there it was used not only by medical officers but by sanitary inspectors. London and Manchester then came into the field, and Liverpool followed. He deprecated the practice of some Government departments of telling local authorities about November or December that they required a certain slight alteration in the statistical returns for the year then about to close. Fourteen or fifteen months' notice should be given before any alteration was made in a basic statistical table. He also pointed out that it was important that a doctor before starting on a statistical research should consult an expert statistician instead of asking the statistician to approve his tables after he had been working on them for many months, for it was quite likely that he had made a wrong assumption at the start. Equally, when a statistician was about to undertake a research of his own he should consult a doctor, because the statistician was rather apt to regard a statement on a card as a definite and indisputable fact. He looked forward to the time when cards filled up after the manner now prevailing in the county hospitals would be available in respect of all patients in the voluntary hospitals and private nursing homes of London. Dr. LETITIA FAIRFIELD pointed out that the value of the statistical tables was no higher than the amount of knowledge and accuracy which went to the registration of each item.

An exhibit of the cards and tabulators was on view at the meeting. On an average each card bore thirty-five punch-holes.

SURGERY OF GASTRO-DUODENAL INFLAMMATION

Dr. J. SCHOEMAKER of The Hague delivered a lecture before the Hunterian Society at a meeting at the Mansion House, London, on January 18, with Mr. H. L. ATTWATER presiding.

Remarking that he had supposed the Hunterian Society to be exclusively composed of surgeons, Dr. Schoemaker devoted himself entirely to the discussion of the surgical treatment of ulcers of the stomach and duodenum, and showed a long cinematograph film illustrating the technique of operation. The indications for operation, he said, lay rather in the territory of the physician than of the surgeon. Everyone knew that an ulcer could be cured by medical treatment, and an attempt must first be made to bring about healing in that way. As soon as medical treatment proved unsuccessful it was the duty of the physician to send his patient to the surgeon. How many cases were cured independently of surgical aid he did now know, because surgeons did not see the patients who

never came to hospital, and he supposed the cases sent to the medical ward were the really serious ones.

No generalization should be made, Dr. Schoemaker continued, as to the kind of operation to be undertaken. The ruling principles were: first, to keep the patient alive, and then to consider the possibility of curing him of his disease. In cases of perforation, when the first necessity was to keep the patient alive, he performed a gastro-enterostomy; only in a case in which the patient was in unusually good condition was a gastrectomy done, although this was the ideal operation. The same held good for haemorrhage. Each case must be considered on its merits. It might be better not to operate immediately, but to endeavour to stop the bleeding and stimulate the patient by blood transfusions, deferring operation until the patient was in a fairly good condition.

Conservative Gastric Surgery

Gastro-enterostomy had the lower rate of mortality, and therefore there were surgeons who preferred this operation in every case, but they were in the minority. To gastro-enterostomy there were many objections. It did not take the ulcer away, nor stop the bleeding, nor prevent perforation, and it might give rise to fresh disturbances, causing peptic ulcer at the edge of the new exit, producing fistula, and perhaps bringing about always a certain amount of gastritis. The mortality after gastro-enterostomy, however, in his clinic was 1.5 per cent., and after gastrectomy nearly 4.5 per cent., and the difference was even greater than these figures suggested, for among the patients on whom he had performed gastro-enterostomy were many who would not have survived the more radical operation. He performed gastrectomy only when convinced that in the particular case the patient could stand it. He was a conservative in stomach surgery. It was necessary to bear in mind that the stomach was not only an organ of digestion, but had other functions—an antiseptic action, destroying micro-organisms in swallowed saliva, and playing a part also in haematopoiesis, and these functions should not be disturbed unless it was absolutely necessary. In dealing with a patient who was weak, vomiting, or very stout so that the inflamed part of the stomach and duodenum was difficult to reach and there was stenosis, the best thing to do was to perform a simple gastro-enterostomy. He claimed 60 per cent. cure, 20 per cent. minor degree of persistence, and 20 per cent. recurrence or no relief. These figures were not ideal, but he did not lose his patients after gastro-enterostomy, and a living man after a gastro-enterostomy was better than a dead one after a gastrectomy.

Problem of Recurrence

In dealing with recurrences it was difficult to determine whether there was a new ulcer or gastritis. Examination of how the stomach was functioning would give some information on that point. If the acid was very low it was likely to be gastritis. If there was a new ulcer at the exit the best thing to do was to resect for the second time. A very narrow duodenum was often found, and in that event it might be necessary to choose again between gastro-enterostomy even on a resected stomach and gastrectomy. In the case of simple stenosis he advised a gastro-enterostomy; in the case of haemorrhage and much pain, resection. In the secondary operations the cure rate was about 50 per cent. If the case was one of gastritis operation was likely to give no benefit. Relief was afforded perhaps for a few weeks, but the condition recurred. The great difficulty in operating in gastritis was that this was an inflammation with no distinct lines showing where it began or ended. He believed that not more than 10 per cent. of all cases need be described as incurable.

Sir JAMES WALTON, Mr. GORDON-TAYLOR, and Professor GREY TURNER joined in felicitations to the lecturer, but there was no discussion.

HEREDITY VERSUS ENVIRONMENT: A FALSE ANTITHESIS?

The old biological ideas of heredity and environment which imply opposition or separateness between the two were challenged by Dr. DAVID FORSYTH in an address to the Eugenics Society on January 19. As Dr. Forsyth was absent on account of illness his paper was read by Dr. C. P. BLACKER, the secretary of the society.

Heredity Becomes Environment

Dr. FORSYTH defined heredity as transmission from one generation to another, and environment as the conditions around an organism. It was the general view—and one he had accepted—that both factors played an indispensable part in development, and that each operated separately from the other. But if heredity and environment were indeed independent their origins should presumably be different, and it should be possible to trace the extent of the sphere of influence of each. If it proved impracticable to recognize either apart from the other must not the value of these two concepts come under suspicion?

The view as to where heredity left off and environment began had not always been the same. At the beginning of the present century the term "environmental" was applied to all that happened after birth, and what happened before birth was designated hereditary or congenital. The birth process was a convenient but not a scientific line of demarcation. At that time the words "ante-natal" and "post-natal" had not been coined. Birth was only an incident in the life of an individual and by no means the most important, being little more than the traverse of a short tunnel in a long biological journey. Once it was established that a healthy embryo might become diseased as a result of unfavourable conditions in the mother all pre-natal influences could no longer be regarded as hereditary, for clearly the maternal body or soma must be considered a part of environment. The term "hereditary" was then restricted to the child and rather loosely to the womb around it, and presently to the embryo only. To-day the separation had been carried back earlier still. Heredity was looked upon as a term applicable only to the germ cell and to what that cell comprised at the moment of fertilization of the female gamete by the male, and all the factors outside this fertilized ovum which might affect it were environmental.

This position was not free from difficulty. According to present views the newly formed fertilized ovum or zygote included within itself all the hereditary factors—if not in the chromosomes and genes alone at any rate in these and the germ plasm—and its environment was the womb, beyond that the maternal body, and beyond that again the outside world. But the fertilized ovum had been made by the union of two sexual gametes, the female of which had remained in the maternal body. To take for a moment the female line of ancestry—the same soma which in the earlier generation was the product of inherited factors exclusively became later an exclusively environmental factor; in other words, heredity became environment. And on tracing the inherited constitution of the embryo forward one generation it too became environment. But clearly the present distinction between heredity and environment could serve only in the case of a single generation; applied over two succeeding generations it became invalid and misleading. Heredity in one generation was environment in the next.

Inherited Environment

Dr. Forsyth turned to the relation between heredity and environment in any one generation. What had the outer world lying beyond the maternal soma, which included the zygote, to say about differentiation between inheritance and surroundings? These external elements were surely nothing but environment—air, moisture, chemicals, nourishment, heat, and light. Nutriment of every kind was passing from the outer world through the intermediary

of the maternal soma, so that the embryo was composed to a very considerable extent of the materials which had constituted its environment all the way through. How was that which had come to it by inheritance to be distinguished from that which had been derived from its surroundings? The very ultimate conveyers of inheritance, the chromosomes and genes, as they grew and multiplied, took in material from that by which they were surrounded.

Support for the contention that any distinction between heredity and environment could only be applied to an organism at any given time and not for any sequence of time was afforded from human psychology. Psychoanalysts had shown the signal importance of the earliest years of life throughout the period when the decisive power was held to emanate from the parents, and many adult psychological disturbances known to have originated in childhood had come to be accepted as environmental and not inherited. But how did the parental influence come to take its particular shape? Must it not have been decided in the parents' own early years when their sensitive personalities were acted upon by the grandparents, and must not the psychological part played by the grandparents have been determined for them by the great-grandparents, and so back to infinity? This transmission of hereditary psychological qualities implied that the moulding of a child's nature by its parents was environmental only when its own generation was considered; from the wider view of successive generations it was hereditary. Dr. Forsyth, while disliking the coining of new phrases, said that "inherited environment" precisely described the situation.

Thus the argument pointed to the replacement of the dual idea of heredity and environment by some other concept of growth. One iconoclasm led to another. When there was no longer any constraint to think of organic life as being divided into these two independent aspects another well-established biological notion might be questioned. In the development of all living things life itself, as a phenomenon, had always been regarded as comprised within each living particle, as the individual quality of each organism from amoeba to man. The question was whether, having regard to the intimate association between an organism and its environment, the idea of a separation could any longer be upheld and the term "life" still be restricted to one side of the dividing line.

Life a Continuum

The body, Dr. Forsyth said, was tunnelled by tubes and passages which reached its furthest interior recesses, and were really prolongations and extensions of environment. Along the alimentary canal flowed nutritives from outside; currents of air, also from outside, passed up and down the respiratory channel: in fact the environment penetrated and permeated the organism. Organism and environment overran one another, spatially and structurally: the frontier between them was involved. The attempt to distinguish between hereditary and environmental influences having been relinquished any new conception must be based on the essential unity of an organism and its environment. From this followed a conclusion of first importance. "Life" became a term to be extended to an organism's external environment, because life could no longer be conceived except as the joint attribute of environment and organism. It resided in both and ceased to be the organism's exclusive possession.

This suggested a further step. The world teemed with organisms of each of which it was true that its life was a matter also of its environment. But the individual environments, such as water and air, were not isolated from each other, they were continuous—an uninterrupted environment over the world's surface. From this the idea was obtained of a continuum of life in which all living things were connected by means of their environment. Life became a property of the chemico-physical medium of water and air which was spread over the globe. The term "inherited environment" which he had already suggested might now be extended to describe the physical environment of every living creature. Were not its surroundings those of its parents and grandparents? Was not this an environment which was transmitted down the generations as truly and literally as were chromosomes and genes? Inheritance and transmission were features of environments as well as of organisms. Heredity was no longer the distinctive and peculiar mark of the development of organisms but was shared by their environments, and there it represented something in the nature of a persistence and repetition of chemico-physical conditions.

Dr. Forsyth concluded an address of many interrogations with one more: "Can it be that what has been called inheritance and transmission in living matter is similarly an expression of a chemical and physical process which keeps on repeating, and that life itself, a repetitive process of this kind, is as much the concern of environments as of organisms?"

DETERMINATION OF THYROID ACTIVITY

At a meeting of the Liverpool Medical Institution on January 7, with the president, Mr. G. C. E. SIMPSON, in the chair, Drs. R. T. GOODYEAR and H. S. PEMBERTON contributed a paper on an electrical method of determining the level of thyroid activity.

Dr. GOODYEAR said that the method had been developed from the studies of Brazier, who was working under a grant from the Medical Research Council. It superseded oxygen metabolism work in that it required no co-operation from the patient and in that it appeared to be specific of the thyroid factor; whereas basal metabolism was governed by factors several of them uncontrollable by the clinician. The method was based on the observation that the phase angle of the body network was altered in thyrotoxicosis. The measurement was made at a frequency of 9,000 cycles per second, the patient having only to immerse the hands and forearms in a 1 per cent. saline solution bath. Within wide limits the measurement was unaffected by variations of saline strength, temperature, depth of immersion of the arms, and by muscular movements. The result was expressed numerically as the tangent of the phase angle or, as Brazier termed it, the "impedance angle." There was a marked difference of this angle in the sexes; the method was also applicable to children. The apparatus was portable and reasonably strong, and its cost was in the neighbourhood of £120.

Dr. PEMBERTON spoke of the results obtained in the measurement of the impedance angle in normal men and women, in states of disease other than of the thyroid gland, in thyrotoxicosis, in myxoedema, and in patients before and after treatment for thyroid disease. In thyrotoxicosis clinically definite and clinically indefinite types were described, and from the former as well as from the change obtained after thyroidectomy it was claimed that the impedance angle had diagnostic significance. The relations of this measurement with that of basal metabolism were discussed, and standard deviations for normals were described. A composite table was shown illustrating the mean values obtained from the measurement of large groups in all the categories mentioned.

Mr. PHILIP HAWE said that the most important feature of the method was the elimination of the difficulties and sources of error usually associated with the estimation of the basal metabolic rate. If the results were confirmed it might be more readily possible to distinguish between cases of thyrotoxicosis and such states as neuro-vascular asthenia. In the speaker's experience cases of thyrotoxicosis treated by operation showed a definite change in the impedance angle in the direction of myxoedema, and it would seem from the results shown by Drs. Pemberton and Goodyear that this change became even more marked as time went on.

Dr. ROBERT KEMP said that the frequency of thyrotoxicosis in the medical wards of the Liverpool Royal

Infirmary was very high. It was by far the commonest condition in the female medical wards, just as peptic ulcer was on the male side. Most of the cases were sent to the surgeon, and highly successful thyroid surgery was being performed in Liverpool, but most of it without basal metabolic records. Drs. Pemberton and Goodyear were in the position of having worked for many years on the estimation of the basal metabolism, but the advent of the new machine had emphasized the drawbacks of these methods. Metabolic estimations were not easily or accurately applicable under clinical conditions, however valuable they might be in research and in physiology. Other clinical methods of measuring thyroid activity did not give consistent results in all cases. Various formulae dependent on pulse rate and pulse pressure were too often vitiated by heart failure and hyperpiesis. At the moment the value of this measurement did not seem primarily diagnostic, but rather, like the temperature and the sedimentation rate, to follow the progress of the illness. It would be of great use in determining the optimum time for operation and in deciding whether pre-operative iodine was taking effect. The work was so striking that under the aegis of a small committee physicians and surgeons in various hospitals should be enabled to measure their own patients and judge its value for themselves. If confirmation was obtained the machine would be as useful as the electrocardiograph and be placed in every hospital.

Treatment of Fractures of the Ankle

Mr. NORMAN ROBERTS, in a paper on the treatment of fractures of the ankle, said that their intelligent treatment could only be based on a proper understanding of the mechanism of production. Ashurst's classification into external rotation, abduction, adduction, and compression injuries was outlined and illustrated by radiographs of typical fractures. He classified cases into major and minor injuries. The differentiation depended on the stability of the astragalus in its socket and was made by a clinical test, in which a deliberate attempt was made to produce lateral movement of the astragalus. If this manœuvre was painless it was evident that there was no danger of displacement on weight-bearing, and rigid fixation could be dispensed with. In the major fractures in which actual or potential displacement existed a long period of careful fixation was necessary; ten weeks was suggested as a minimum period for any complete fracture-dislocation. In the absence of direct injury to or comminution of the weight-bearing articular surface the prognosis depended entirely on the degree of success in obtaining anatomically perfect reduction. In the adduction and compression injuries traumatic osteo-arthritis accounted for the frequent incidence of painful stiffness of the ankle. It was largely unavoidable, and could be relieved by arthrodesis of the ankle.

Mr. BRYAN MCFARLAND picked out what he thought were the difficult fractures of the ankle. Of recent fractures that in which both malleoli were broken at the same level as one another and at the same level as the upper surface of the astragalus presented difficulties in setting, because it was so easy to move and could easily be over-reduced in any direction. The best way was to feel the edges of the internal malleolar fracture with the thumb by pressing deep in the swelling. The second difficult fracture was the anterior marginal, in which dorsiflexion displaced the fragment upwards and plantar flexion was apt to ride the astragalus forward on to it. Of late fractures when malunion was established there were two main types. First, the large posterior marginal with the astragalus articulating with the fragment which had joined the shaft in a displaced position leaving an anterior buttress. This buttress could be removed and a fair range of painless movement obtained. Secondly, the backward and outward dislocation of the ankle. Up to a certain stage it was possible to reconstruct the fracture, but after anything like six months there was only one satisfactory procedure, and that was to arthrodese the ankle.

Local News

FRANCE

[FROM OUR CORRESPONDENT IN PARIS]

Precautions Against Influenza

The Minister of Public Health issued in January a memorandum on the measures to be taken to prevent the spread of influenza to France from her neighbours. The first warning concerns the avoidance of public meetings in confined spaces, the dangers of which are, it is pointed out, particularly great for the very young, for the very old, and for the delicate. Secondly, people are advised to remain at home and summon a doctor at the first appearance of symptoms. Thirdly, cases of influenza complicated by pulmonary or other ailments should be notified to the public health authorities, although such notification is not legally compulsory. The aim of this recommendation is to obtain early information about dangerous foci of disease. Hospitals are also requested to send in returns as to the cases of influenza in their care. It is hoped that this measure will favour isolation of the patients in hospitals for civilians.

The Retiring Age for Doctors

The Conseil de la Fédération Corporative des Médecins de la Région Parisienne has unanimously adopted a resolution which runs counter to the notion that doctors must retire from work at a given age (65) for the benefit of their younger brethren, if not for that of their patients. The gist of this resolution is that the age limit for professors who teach medicine should be 70 years, and in the case of those professors who are members of the Institute, 75. On the whole, the outcry in favour of the compulsory retirement of doctors at the age of 65 has not enjoyed a good press.

Control of the Milk Supply

The Commission du Contrôle du Lait has issued a strongly worded report through Dr. E. Lesné, whose communication on the subject of control of milk supplies at a recent meeting of the Academy of Medicine was followed by a vote in which the conclusions of this report were adopted by the Academy. It appears that hitherto the sanitary control of milk supplies, as exercised in most other countries, does not exist in France, where it is facultative, not obligatory. The Commission finds that this facultative control has in practice achieved very limited results, and that what is urgently needed is compulsion under the combined supervision of doctors, veterinary surgeons, public health workers, chemists, and bacteriologists. In the past doctors and veterinary surgeons have repeatedly issued warnings, to which legislators have turned a deaf ear. The Academy is prepared to work out a complete scheme of sanitary control of the milk supply if given a mission to do so by the Government. And as the present Government is more addicted to drastic action than to pious platitudes, it looks as if the prospects for reform in this field are quite hopeful.

The Campaign Against Venereal Disease

As already reported in these columns (December 12, 1936, p. 1222), M. Henri Sellier, the Minister of Public Health, has issued the draft of a new and comprehensive law dealing with the white slave traffic, the control of prostitution, and the campaign against the venereal diseases. This draft was presented to the Government on November 5. During December M. Sellier issued a string of circular letters to the prefects throughout France, in which he has made it abundantly clear that though the penalties provided in his draft scheme cannot be applied until it has become law, there is

no need to wait for this before setting other features of his scheme in operation. The prefects are invited promptly to co-operate in an investigation into the incidence of general paralysis of the insane since the introduction of modern methods of treatment with arsenic, bismuth, and malaria. Has the clinical picture of general paralysis been profoundly changed by this treatment, and how often does general paralysis end in its classical final stage? Why has not the modern treatment of syphilis prevented the appearance of general paralysis? These are some of the pertinent questions to which M. Sellier hopes to get satisfactory statistical answers by inducing medical officers of mental hospitals to send in annual reports drafted according to a unified system he has devised. It seems that social welfare workers are to play a large part in the venereal disease campaign, and that they are to be employed in tracking down old sources of new infections. M. Sellier would like to see the diagnosis of general paralysis followed by an inquiry among the patient's relatives, so that any of the latter found to be syphilitic may enjoy the benefits of specific treatment before they develop G.P.I. And, pending the formal adoption of the new regulations, prefects must see to it that the opening of "maisons de tolérance," "maisons de rendezvous," and all the other "maisons" with terminologically seductive titles is frowned on officially.

ENGLAND AND WALES

National Appeal for People's League of Health

Lord Leverhulme entertained members of the Press and others at luncheon at the Savoy Hotel on January 19 with a view to announcing the first national appeal of the People's League of Health. He said that the League had now been in existence for twenty years. It was conceived in the mind of one person, Miss Olga Nethersole, who had remained its indefatigable honorary organizer. Its motive was that as far as possible disease, wastage, and suffering should be prevented by removing their causes. The League had published a large variety of authoritative pamphlets, the work of medical experts in their different fields. It had promoted health weeks and instituted courses of lectures. Over eighty men and women eminent in the medical world gave their expert knowledge on its medical council, and it had also science and veterinary councils. Through committees of experts it had investigated specific problems, and the findings, when these were conclusive, had been impressed on the Government by deputations. He referred to the "Safe Milk Campaign" instituted by the League in 1930, and its present inquiry into maternal mortality and morbidity, which had established the important presumption that some of the ills attending pregnancy could be attributed to certain deficiencies in diet. If these deficiencies could be made good it was believed that a serious diminution in the toll of maternal mortality and morbidity would result. A large scheme to this end had been initiated by the League with the co-operation of nine London hospitals. Coming to the appeal, Lord Leverhulme said that hitherto the work of the League had depended on the annual subscriptions of a comparatively small number of supporters. It was desired to enlarge its scope, to press on with the inquiries already initiated, to tackle new problems, and to give a permanence to the work. The information bureau could with advantage be developed into a central almoner service for supplying to the country generally the service which almoners gave to hospitals. It was hoped also to carry out an investigation into the conditions under which infants and young children were received by foster-parents. Further studies were projected regarding the amount of disease and suffering caused to children by infection with the bovine variety of the tubercle bacillus. The appeal would be inaugurated by a banquet at the Guildhall on April 15 over which the Lord Mayor would preside and at which support for the cause would be given by Lord Horder and other eminent speakers. The thanks of the company to Lord Leverhulme for his hospitality were voiced by Dame Louise McIlroy.

Guy's Hospital Medical School

An important extension is now in course of erection at the Medical School of Guy's Hospital. The new building will provide for a complete pathological institute and give much more accommodation to every other department except chemistry, which will not be affected by the change. When the extension is completed the whole school will be centralized in one block of buildings with easy access between the various departments. The new building will provide: (1) A large and modern pathological department with plenty of research accommodation; (2) pathology, bacteriology, and clinical chemistry housed under one roof; (3) adequate accommodation for the medical research unit and for the pharmacological department; (4) a physics department large enough to prevent the necessity of the duplicating of classes; (5) an extension of the research accommodation available in the physiological department; (6) an additional demonstrator's laboratory and an extension to the dissecting room; and (7) a large staff common room for the members of the clinical staff and the teaching staff of the school. The removal of the physics department from the existing buildings will enable better accommodation to be found in the school for operative surgery and for *x*-ray living anatomy and human physiology.

Empire Conference on Tuberculosis

Under the auspices of the Over-seas League and Papworth Village Settlement an Empire conference on the care and after-care of tuberculosis will be held in London, at Over-seas House, from May 3 to 8. The patron is H.R.H. the Duke of Kent and the president Lord Willingdon. The conference is being arranged in view of the large number of medical women and others interested in tuberculosis who will visit London from the Dominions and Colonies for the Coronation. The success of the Papworth Settlement not only in arresting tuberculosis but in employing the ex-patient in productive industry suggests that there is an urgent need for the study of similar methods throughout the British Empire. A preliminary programme has been drawn up for the six sessions, the subjects being the fight against tuberculosis, the after-care of the tuberculous, and the native races and tuberculosis throughout the Empire. The chairmen include Lord Dawson of Penn, Lord Horder, and Professor Lyle Cummins; and the speakers, Sir Kingsley Wood, Sir Pendrill Varrier-Jones, Dr. B. A. Dormer, Lieut.-Colonel G. G. Jolly, I.M.S., and Dr. P. V. G. Benjamin, followed by representatives from the Dominions, Colonies, and Protectorates. Application forms may be obtained by those wishing to take part in the proceedings from the secretary of the conference, Sir Evelyn Wrench, at Over-seas House, St. James's, S.W.1.

Radium Institute for Bradford

The Lord Mayor of Bradford presided over a meeting at the Town Hall on January 21 to inaugurate an appeal for £50,000 for the establishment of a radium institute in that city. He explained that the proposal to make this a Coronation Year Memorial had come to him from an eminent Bradford surgeon. The provision of the institute would be a purely voluntary effort, controlled by a committee. A site was available, without cost, in the grounds of the new Royal Infirmary. Dr. Chester Williams said that the work of the radium therapy clinic at the Royal Infirmary had doubled since its establishment about eight years ago. He emphasized the importance of centralizing the use of radium. Mr. Peter McEwan also spoke in commendation of the appeal, and the mayors of Halifax, Keighley, and Brighouse each promised the support of their towns.

Correspondence

The Wellcome Trust

SIR,—As the trustees appointed by the will of the late Sir Henry Wellcome we ask you to be good enough to publish this letter in order to clear up any misconception which may have arisen with regard to the effects of the will. We are led to make this statement by the number of appeals for contributions to various research undertakings which have already reached us. For reasons mentioned below the trustees will not be able to consider any such applications in the immediate future.

In January, 1924, the Wellcome Foundation Limited was formed for the purpose of taking over the whole of the business activities of Burroughs Wellcome and Co. and the various scientific research institutions and museums established by the late Sir Henry Wellcome, who held the whole of the share capital.

By the terms of the will the shares of the Wellcome Foundation are now vested in us as trustees, and the activities of the Foundation throughout the world will be carried on, in collaboration with the trustees, by a board of directors, of whom the present governing director is Mr. George E. Pearson, who has been closely associated with the late Sir Henry Wellcome for more than forty years.

It will be realized that owing to the magnitude of the testator's estate a very large sum has to be found for death duties. Provision has also to be made for:

(*a*) A welfare fund for the benefit of employees of the Wellcome Foundation Ltd. and its associated companies;

(*b*) The payment of certain specified annuities to relatives and others personally connected with the testator;

(*c*) The erection and maintenance of a building in Minnesota to be dedicated as a memorial to the testator's parents.

Subject to these prior charges the remainder of the divisible profits will be utilized in accordance with the testator's instructions in the following manner:

1. For the maintenance of "The Research Undertaking Charity," which is a fund for the advancement of medical and scientific research work in any part of the world conducive to the improvement of the physical conditions of mankind, and in particular for the discovery, invention, and improvement of medicinal agents and methods for the prevention and cure of disorders, and the control or extermination of insect and other pests which afflict human beings and animal and plant life, and also for the organization, equipment, and expense of special research expeditions and commissions.

2. For the maintenance of "The Museum and Library Charity," which is a fund for the establishment or endowment of research museums or libraries in any part of the world, and for the collection of information of every kind connected with the history of medicine, surgery, chemistry, bacteriology, pharmacy, and allied sciences which in the opinion of the trustees may be desirable.

This statement of the position has been somewhat delayed by the fact that the testator imposed upon all his trustees the obligation, before undertaking the Trust, to enter into a covenant not to be engaged in or in any way to assist in any concern which carried on a business in competition with Burroughs Wellcome and Co. Three of the trustees had no difficulty in entering into this covenant immediately after the testator's death, but the two medical and scientific trustees felt that certain words in the covenant might be held to restrict them unduly in the performance of their official and general duties to medical science and to imply their particular concern with the business interests of the Foundation. The matter has now been considered by the High Court of Justice, which has made an Order allowing them to enter into a covenant in a form removing any such unacceptable implication and enabling effect to be given to what was known to have been the testator's intention.

No trustee, director, or any other person holds for himself or in his own right any shares in the Wellcome Foundation, and all the divisible profits in each year will be devoted to the various purposes named in the will and indicated above.

We believe this to be the first example, in this country at least, of a testamentary decision by which the whole of the profits from a great manufacturing and trading organization, after certain personal and memorial bequests have been fulfilled, are permanently dedicated to the advancement of knowledge for the general benefit of mankind. —We are, etc.,

G. HUDSON LYALL.
H. H. DALE.
L. C. BULLOCK.
MARTIN PRICE.
T. R. ELLIOTT.

January 28.

*** The following is the text of the proviso which, by order of the Court, may be added by a trustee to the covenant required of all the trustees under the will of Sir Henry Wellcome.

> "PROVIDED that nothing in this Covenant shall be held to prevent me in the exercise of my proper function in any appointment held by me in the public service or under any publicly or privately endowed organization for the promotion of medical research or under any University in Great Britain from giving advice on scientific matters to any person or persons solely for the purpose of rendering scientific discovery available for the general use and without pecuniary reward or other personal advantage to myself."

Cancer of the Breast

SIR,—The lecture by Mr. Cecil Rowntree printed in your issue of January 23 (p. 153) on cancer of the breast is full of interest, and consequently of points for discussion. One of these seems to me to call for particular comment. Under the heading "Results of the Operation" Mr. Rowntree refers to statistics showing that less than half the patients operated upon for cancer of the breast in its earliest stage (Class I of the statisticians) are free from any signs of disease at the end of five years, and that the figure drops to "something like 20 per cent." when the axillary glands have been invaded (Class II). At the end of the paragraph he says that in a later stage still (presumably Class III) "the survival rate drops almost to nothing."

I do not know, however, of any extensive statistical survey where the incidence of recurrence has been taken into account. On the other hand, there is much evidence to show that the *survival rate* following the best surgery is much better than the gloomy figures quoted by Mr. Rowntree. It is not clear, however, whether his remarks refer to survival rate or to survival without recurrence.

This uncertainty necessitates reference also to Mr. Rowntree's remarks on the use of radium. He mentions my work in this connexion, and gives the impression that the use of radium has been found unsatisfactory and is being gradually abandoned. Presumably, therefore, the

statistical results following the use of radium have been even worse than following the operation alone. I believe, however, that very few, if any, surgeons besides myself have over a number of years employed radium, or radium combined with very conservative surgery, in the treatment of early carcinoma of the breast. In my experience the results of these methods have proved to be virtually the same as those obtained from the best surgery, and I have seen no reason for abandoning the use of radium. I hope later to be able to publish a report of the results obtained with radium up to the end of March or April of this year.

Radium technique has not stood still since it began to be developed at St. Bartholomew's about twelve years ago and its value and limitations in cancer of the breast began to be fairly clear.—I am, etc.,

London, W.1., Jan. 24. GEOFFREY KEYNES.

The Problem of Endemic Goitre

SIR,—Dr. George Graham, referring in your issue of January 23 to my article on the above subject (*British Medical Journal*, January 2, p. 29), draws attention to "a mistake" which he considers I made "in attributing the discovery that cyanides may cause goitre under certain conditions to Webster." The passage in my article to which he refers is this: "Among those [chemical substances] capable of causing goitre in animals under experimental conditions are calcium, boron, silica, tellurium, organic acids, amines (Pighini, 1933), and cyanides (Webster, 1933)." The references here are not to discoveries, but to a convenient source—*Proc. International Congress on Goitre*, Berne, 1933—from which those who desire it may obtain recent information in regard to these goitrogenic substances.—I am, etc.,

Oxford, Jan. 23. R. MCCARRISON.

Treatment of Prostatic Obstruction

SIR,—In his letter in your issue of January 16 on prostatic obstruction Mr. F. McG. Loughnane states that "generally at least 96 per cent. of prostatic patients can be successfully treated by endoscopic resection." If *generally* here means all and sundry who have access to a resectoscope, a word of warning must be sounded. Even in the hands of those with most experience in this method of treatment it is doubtful whether a really successful issue can be secured in this high proportion of cases; and it is certain that a very great deal of experience is required before even moderately large glands can be attacked endoscopically with a reasonable chance of giving a result satisfactory to the patient. In this connexion it is not sufficiently appreciated that even a small residuum of infected urine may be death-dealing some time after the patient has left the hospital. A completely emptying bladder must be secured. A further late complication which has not received sufficient attention is the development of an intractable prostatitis in the portion of the gland inevitably left behind in an endoscopic resection; this is not common, but sufficiently often met with to warrant consideration when sizing up the pros and cons for closed *versus* open operation in any particular case. Finally, in my experience considerably more than 4 per cent. of prostatic patients have a urethra of a calibre insufficiently large to admit the commonly used 30F resectoscope. No amount of preliminary dilatation will allow such small urethrae safely to accommodate the instrument. The smaller-gauge resectoscopes may be employed in such cases, but entail a long and wearisome procedure where the gland is of considerable proportions. The use of unduly large instruments has led to a not inconsiderable number of urethral strictures.

I introduced the modern transurethral (endothermy loop) prostatic resection operation into this country in September, 1930, and after an experience of more than 400 cases (largely municipal hospital patients) am satisfied that the functional results are not so satisfactory as enucleation for general enlargement of the gland. The transurethral type of operation may be employed in gross enlargements where the open operation appears to carry an unnecessary operative risk, but in a "good-risk" case should not be the first choice. For an eighteen-month period in 1932–3 I employed the endoscopic technique in approximately 90 per cent. of prostatic obstructions in hospital practice, but after a careful follow-up of my cases have reached the above conclusion. The brilliant work, moreover, of the late S. Harry Harris has given urological surgeons a more exact method of securing haemostasis in the open surgery of the prostate and an almost certain means of preventing post-operative obstruction. To those who have mastered the technique of this procedure the endoscopic resection of a generalized enlargement of the prostate in a relatively "good-risk" case will be seldom employed.

Endoscopic resection has a very definite place in the treatment of the fibrous prostate or sclerotic bladder neck, post-prostatectomy obstructions, obstructing carcinomatous glands (where not unduly large), and certain "bad-risk" cases of generalized enlargement. In the remainder, constituting the majority of prostatic obstructions, my present view is that open surgery gives more satisfactory results.

I have reviewed my series of prostatic obstructions treated during the past two years and find that I have employed endoscopic resection in 32 per cent., one-stage Harris prostatectomy in 40 per cent., two-stage prostatectomy in 21 per cent., Steinach II in 3 per cent., and suprapubic cystostomy alone in 4 per cent. These figures, of course, represent only the present views of an individual surgeon, but my object in bringing them forward is to decry the application of a standard operative technique in cases of prostatic obstruction where the concomitant complications are so varied.—I am, etc.,

London, W.1, Jan. 18. TERENCE MILLIN.

SIR,—I read with great interest Mr. F. McG. Loughnane's letter in the *Journal* of January 16 (p. 144). He raises several points with which I should like to deal.

The first refers to Mr. Loughnane's advocacy of posterior urethroscopy. This is a most valuable procedure, especially immediately before, during, and after the operation of perurethral resection of the prostate. I do not, however, regard it as an essential diagnostic procedure to be carried out in every case. A simple cystoscopic examination of the bladder neck to my mind readily indicates the type of case suitable for suprapubic prostatectomy without adding to what is already a somewhat laborious investigation. It is especially when doing a perurethral resection that posterior urethroscopy is so essential, and I have carried it out in almost all my resections. The construction and the additional direct telescope of the von Lichtenberg-Heywalt resectoscope permit an admirable view of the whole prostatic urethra, so that the operator's attention may be drawn to any convexity, bar, etc., which may require elimination.

The second point which Mr. Loughnane raises touches one of the fundamental points which I attempted to emphasize. Towards the beginning of my article I freely admitted that excellent series of results could be and were

produced by individuals carrying out the perurethral method exclusively, but on the grounds of logic and common sense I feel strongly that while large adenomatous prostates can be and are treated by the perurethral method, it is by no means the best way of dealing with them.

Finally, with regard to Mr. Loughnane's dislike of prolonged drainage of the bladder by the in-dwelling catheter, I am aware of the difficulties of carrying this out, but by means of a technique designed to avoid complications this method can be successfully used for months at a time if necessary. I am sure Mr. Loughnane would agree that even a suprapubic de Pezzer catheter can cause sufficient fibrosis to render subsequent suprapubic prostatectomy a less satisfactory operation both as regards exposure and re-trigonization of the prostatic bed than if performed as a primary procedure.—I am, etc.,

Liverpool, Jan. 18. J. COSBIE ROSS.

Angioneurotic Oedema

SIR,—I was interested in the case of angioneurotic oedema recorded by Dr. David R. Hughes in the *Journal* of January 16 (p. 121) because of the presence of albumin and pus in the urine. Since the association of urticaria with a urinary infection was forcibly brought to my notice in the case of a doctor some years ago, I have looked for such an infection in all cases of urticaria and angioneurotic oedema where there has been no obvious cause, and I have been amazed at the frequency with which a *B. coli* or other infection of the urine has been found, even though previously quite unsuspected.

The connexion between the two conditions has been proved in many such cases by the disappearance of the urticarial attacks after the urinary infection has been cured.—I am, etc.,

Sheffield, Jan. 20. ROBERT PLATT, M.D., F.R.C.P.

Inhalational Therapy

SIR,—Your leading article in the *Journal* of January 23 (p. 175) is indeed timely. Inhalational methods of medication in diseases of the respiratory tract, and, still more important, the wider methods of physical medicine, including chest remedial exercises in such diseases, have been a sadly neglected chapter in medicine. In the inhalation department at the St. John Clinic and Institute of Physical Medicine (under the jurisdiction of the Order of St. John of Jerusalem), the only department of its kind in this country, we have observed remarkable results in many chronic respiratory disorders, including asthmatic subjects, who have failed to respond to the usual methods of drug therapy alone. Moreover, it is not without interest that through the influence of the British Health Resorts Association certain British spas, which are beginning to specialize in these chronic respiratory disorders, are taking up this important branch of medicine, and one of these spas is actually engaged in the construction of an inhalatorium run on similar lines to that at the St. John Clinic.

Countless numbers of asthmatic subjects and those suffering from chronic respiratory diseases who have had prolonged treatment without appreciable benefit come to the inhalation department from all parts of the country, and experience great benefit from this treatment in conjunction with other physical methods.

Let us, however, not abuse a valuable form of treatment and run the risk of getting it into disrepute by making claims for it which it can never endure. In asthma, for example, the environmental, psychological, dietetic, medicinal, and other factors all have their part to play, and if these are minimized at the expense of making claims for a form of treatment which has hitherto been neglected, that attitude, apart from being unscientific, serves no other purpose than to bring the type of treatment in question into disrepute, which would be unfortunate.—I am, etc.,

St. John Clinic and Institute of Physical Medicine, Jan. 22. PHILIP ELLMAN.

Glycosuria

SIR,—Before drawing conclusions as to the significance of glycosuria from the case he describes in your issue of January 23 (p. 194) Dr. Anderson should first be sure that it was glucose and not lactose which he found in his patient's urine; this is not clear from his description.

It has, of course, long been recognized that lactosuria is comparatively common among nursing mothers, particularly, I imagine, in a case such as this, when the breasts are distended; but this does not necessarily indicate any metabolic disturbance.—I am, etc.,

London, S.W.20, Jan. 24. S. VATCHER, M.D.

Blood Transfusion

SIR,—In his letter in the *Journal* of January 2 (p. 40) Dr. R. Vaughan Facey raised the question of the possible danger of repeated blood transfusion from the same donor. I was unfortunate enough to experience an untoward result in such a case. The clinical notes not being at present available to me I write from memory.

The patient was a woman aged 30, suffering from aplastic anaemia (possibly of specific type as there was a comparatively recent history of luetic infection, and despite active treatment the Wassermann and Kahn reactions were positive). The anaemia, which was extremely severe, was accompanied by haemorrhagic symptoms—bleeding from the gums, purpura and retinal haemorrhages, and profuse and prolonged menstrual flow. No form of treatment other than blood transfusion was found to produce any improvement.

Two days after admission to Paddington L.C.C. Hospital the patient received her first transfusion from the donor in question. He was a friend, not related to the patient, and was of the same blood group (Group II Moss). In addition a direct matching test revealed no agglutination. This transfusion, approximately 600 c.cm. of citrated blood being given, produced no untoward effects, and an immediate improvement was noted in both blood picture and haemorrhagic symptoms.

Further transfusions were given at intervals of a few days until a haemoglobin level of about 75 per cent. was reached. This was maintained so long as transfusion was repeated at intervals of not more than about ten days. A different donor was employed on each occasion, and none of the transfusions caused any undesirable symptoms.

Approximately eight weeks after the first transfusion the same donor was employed again. No direct matching test was done on this occasion. After receiving 200 to 300 c.cm. the patient became pale and complained of faintness. Shortly after this she vomited and the pulse became rapid and feeble. There was no dyspnoea. The infusion was stopped when somewhat less than 400 c.cm. had been given. The patient continued to vomit at intervals during the next twelve hours and complained of severe headache and general weakness. The most striking feature, however, was a return of the haemorrhagic symptoms: the gums began to bleed again, and a menstrual period, which had ceased shortly before the transfusion, recommenced, the loss being extremely profuse. In the course of a day or two the haemoglobin fell to the level of about 30 per cent. and the patient's general condition, previously very good, became critical.

Further transfusions were given at shorter intervals, and eventually the patient began to improve again, though uterine haemorrhage continued for over two weeks. One subsequent transfusion produced a transient, generalized, urticarial erup-

tion, without any more alarming symptoms, however, and with full beneficial effect upon the blood picture. When I last saw the patient she was again in good condition, though profuse menstrual loss was still troublesome. In all the transfusions citrated blood was employed and was given through a small needle at the rate of 10 c.cm. per minute.

These particulars are given by permission of the county medical officer of health.

—I am, etc.,

A. L. JACOB, M.R.C.P.,
Assistant Medical Officer, Paddington
Oslo, Jan. 13. L.C.C. Hospital.

Sclerosing Submucosal Injection of the Turbinates

SIR,—Doubtless Mr. C. A. Hutchinson's technique for reducing hypertrophied turbinates (*Journal*, January 9, p. 72) will accomplish their shrinkage, and his strictures on the wrong way, which seems to be the common way, of using the cautery for this purpose are just. But there is a right way, suggested many years ago by an American in the *Laryngoscope*. Mr. Hutchinson correctly says that the object should be shrinkage without damage to the cilia. This can be obtained by using a fine, rather long cautery point, puncturing the fore end of the lower turbinate with it, and pushing it gently into the substance of the turbinate, where it can be further manipulated without damage to the cilia save at the negligible puncture. The Oudin needle can be used to the same effect.—I am, etc.,

Glasgow, Jan. 17. JAMES ADAM, M.D.

Substances Promoting Cell Growth

SIR,—The interesting paper in the *Journal* of October 10, 1936, by Dr. Joseph Needham (p. 701) on substances promoting normal and abnormal growth stimulates me to voice ideas which for some time have been forming in my mind and which have been published elsewhere.

It is evident that every living cell has an organizer or normal growth factor in its make-up. This organizer is not even destroyed by boiling, and its chemical nature belongs to the class of sterols, and is closely related to carcinogenic substances such as tar, etc. Needham has shown us how hormones and vitamins can promote or delay growth according to their absence or presence. They may have a specific action on certain tissues as is the case with pituitary or ovarian hormone, even to the extent of producing mammary cancer in mice with certain hereditary factors. The question now becomes one of "What prevents cancer?" rather than "What causes cancer?" When cells took on communal life it became urgently necessary that some limitation be placed on how many of each variety would be allowed to survive, so some method had to be devised to limit their numbers to the required amount. This could only be done by depriving them of some normal growth factor they originally possessed. It had to be some mechanism common to all the cells. Cells had to be nourished and their waste products removed; in the primitive organisms this was carried out by lymph circulation. To remove the organizer or normal growth factor the cells lining the lymph channels must have possessed some selective activity on this particular substance. Sampson Handley has shown clearly that when the terminal lymph tubules become blocked by organisms or exfoliative epithelium enormous hypertrophy of the papillae drained by them takes place. This eventually in many cases becomes malignant. In a normally functioning animal the organizer is kept within bounds, but should an abnormal amount be continually applied to one spot it is not to be wondered at that the normal mechanism breaks down and uninterrupted growth takes place, as happens on the constant application of tar, etc.

From whatever angle we look at the subject we have to concentrate on the factor which is normally responsible for the extraction of the organizer present in every living cell, and find out why it is failing in its job. Once a group of cells is deprived of this restraining influence it becomes equivalent to culturing living cells in a satisfactory medium *in vitro*. The commonest blockage of lymph terminals is by collections of organisms and epithelial debris, though cold can also do it, as seen in chilblain, and cold as well as heat can produce malignancy. It has been suggested that if this was so one ought to find malignancy in elephantiasis. In this condition it is the lymphatic channels and not the terminals, that are blocked. With the blockage of the terminals strangulation of vessels ensues, and destruction of the epithelial lining of the terminals takes place. With blockage of the lymphatic channels there is not necessarily any destruction of the epithelial lining of the terminals, which still carry on their selective activity. Must we not, then, cease to look for the cause of malignancy, but concentrate on the reason why we do not all get cancer?—I am, etc.,

SYDNEY PERN, M.R.C.S., L.R.C.P.

Ballarat, Australia, Dec. 4, 1936.

Pathogenesis of Cancer

SIR,—It may interest the eminent surgeon Mr. Frank T. Paul (*Journal*, January 16, p. 141) to know that conditions in Egypt support his theory regarding nutrition and sex conditions as agents causative of cancer. Having practised for twenty-seven years in Cairo the absence of cancer among the fellaheen has struck me as very remarkable. They live a primitive life among their diseases and dirt, working from sunrise to sunset, often in a blazing sun, on starvation wages. On the other hand, among those Egyptians who live in luxury and gaiety at the expense of the vast majority the same cannot be said, and, according to recent information, with them malignant disease is becoming more common. By way of illustration some striking examples could be quoted. Of course the vitality of the sex hormones is proverbial, but the sex life in comparison with Europeans is short, due to various causes, but mostly to the universal use of the so-called aphrodisiacs, such as hashish, etc., now, however, not so easily obtainable, by the workers especially.—I am, etc.,

Folkestone, Jan. 19. T. GERALD GARRY, M.D.

Recurrent Extragenital Haemorrhages

SIR,—A few days after having read the interesting article by Dr. William H. Gossip (*Journal*, January 9, p. 69) on recurrent extragenital haemorrhages I was called to see a young lady, 19 years of age, who informed me that she had had a spontaneous bleeding from the right eye. She was menstruating at the time. She and her mother, who were greatly alarmed at the haemorrhage, estimated the amount of blood lost from the eye at about one teaspoonful. This was the first occasion on which she had had any extragenital bleeding associated with menstruation. In her case there is a definitely raised blood pressure. During the past year it has ranged from 90 to 100 mm. Hg diastolic, and from 140 to 160 mm. Hg systolic. She is of plethoric habitus, and suffers from frequent headaches. There is no history of epilepsy or hysteria.—I am, etc.,

Edinburgh, Jan. 22. DOUGLAS ROBERTSON.

Injection Treatment of Hernia

SIR,—The current literature on this subject, while mentioning the old, bad, unsafe methods of pre-aseptic days, does not sufficiently stress the distinction between these and the modern methods which have evolved from the last twenty years of research. Originally solutions were employed which were decidedly irritating if not dangerous, such as iodine, cantharidis, turpentine, etc., and these, injected with no aseptic precautions, led inevitably to results which brought the treatment into disrepute, and this, coinciding with the advent of general anaesthetics and consequent operative procedure, caused further work on the subject to be abandoned.

Recently a great deal of fresh work has been done on the subject. Experiments on guinea-pigs, dogs, and monkeys have shown that with the use of mildly irritating small injections into the fascia of tannate and gallate solutions of different plant principles within a few hours there is a definite reaction largely manifested by oedema of the tissues and the production of fibroblasts, which appear later as young fibrous tissue cells. At the end of two weeks the cells appear well developed, and for each injection there is a small area of firm fibrous tissue.

Pina Mestre, who first described this treatment for hernia in 1927, has used it in more than 10,000 cases. Almost without exception the procedure closed the canal, and eradicated the hernia, in from ten to fifteen injections.

In certain cases, such as irreducible hernia, the radical operation is the only possible treatment, but where operation is contraindicated—as in old age and heart or lung disease—or when operation has failed, then the injection treatment provides a safe and satisfactory alternative.

In the operation for radical cure tissues are divided, muscles anchored in situations foreign to them, and possibly weak and flabby muscles united. The injection treatment is not open to any of these objections, and it not only closes the aperture but reinforces and strengthens the muscles bounding it. Theoretically, then, the injection treatment compares favourably with the operation. Its other advantages are undeniable. (1) It can be used at any age. (2) It is entirely ambulatory. (3) The patient is not required to stop work. (4) No hospital or nursing home expenses. (5) If not completely satisfactory a few further injections will reinforce the barrier already laid down.

In the last eighteen months I have used this treatment successfully in cases of indirect inguinal hernia, direct inguinal hernia, and recurrent hernia after operation, and have been most impressed by the remarkable response in cases of recurrent hernia. In one instance five injections sufficed to repair the damage. It would appear that the tissues, which have already been subjected to trauma and have made feeble and ineffectual attempts at repair, react more strongly to the stimulus of the proliferating fluid than those where no such attempt has been made.

It is obviously necessary that the hernia should not be allowed to protrude once the treatment has been started, and certain writers have insisted on the necessity of wearing a strong steel spring truss during the day and allowing a webbing appliance at night. This has obvious disadvantages, as it entails the removal of the truss by the patient twice daily. Recently an appliance has been devised in America which has met with the approval of the exponents of the treatment there. This is stiffer than the usual webbing appliance, and is capable of retaining the hernia during the day and can still be worn with comfort at night. This enables the patient to wear it continuously during the treatment, it being removed only to give the injection. I have used the appliance in this country, and find that it satisfactorily fulfils its purpose.

From my own experience of the injection treatment I think that it is all that is claimed for it, but is specially valuable where operation has failed.—I am, etc.,

London, W.1, Jan. 20. E. W. ARCHER.

Modes of Administering Thyroid Substance

SIR,—Dr. H. Gardiner-Hill asserts (*Journal*, January 16, p. 133) that when thyroid substance is administered in acute infections such as tonsillitis and influenza, thyrotoxaemia is liable to develop. This alarming statement has interested me very much because, although I have prescribed thyroid very frequently in the past fourteen years for many acute infections, including influenza and pneumonia, but not tonsillitis, not once have I seen this serious condition arise. This discrepancy in experiences may be due perhaps to the technique I use, as it differs slightly from Dr. Gardiner-Hill's; for whereas he orders thyroid in the usual tablet form and manner, my practice has been never to order it for an acute infection without combining it with a fractional dose of potassium permanganate, which is given by the mouth or bowel, according to the type of case. This is a method I have learnt to respect, partly from personal observations, but chiefly through reading or listening to what other observers have had to say on the subject after using the same technique as myself.

For example, some seven years ago I read a report in this connexion which so convinced me that this combination method might have unexpected advantages over the older method that I have continued to study and use this newer therapy ever since. It ran as follows:

"During the last two years in Cairo sixty-nine cases were diagnosed pneumonia; sixty-four of these were treated with potassium permanganate and thyroid with four deaths; in five cases not so treated there were three deaths. . . . It is stated that the patients differ noticably from those not so treated, the tongue is cleaner, food is taken better, and there is less toxaemia."

This passage is taken from the Report on the Health of the Army for the year 1928, vol. 64, p. 31.—I am, etc.,

Guildford, Jan. 20. HERBERT W. NOTT.

Atypical Anthrax

SIR,—I was interested to read in the *Journal* of January 9 (p. 73) of an unusual case of anthrax, described by Dr. A. E. Hodgson, as it was my lot to encounter a case of anthrax which, although it did not present similar features, may be of interest to your readers on account of the absence of a typical cutaneous lesion. Unfortunately the condition was undiagnosed and had a fatal issue.

A labourer on a sewage farm was admitted to hospital with a history that a week before admission while loading manure he received a puncture wound on the dorsum of the fourth web of the right hand from a fellow-worker's digging fork. The wound bled a little and did not attract any further attention until the day before admission to hospital, when painless swelling of the whole hand was noticed.

On admission the patient, aged 29 years, was found to be a powerful and healthy adult whose only complaint was the swelling of his right hand; the temperature was 99° F., pulse rate 90 per minute. His general condition was excellent. On the dorsum of the right hand between the heads of the fourth and fifth metacarpals was a healed puncture wound, which was not even tender. The outstanding feature, however, was the massive oedema of the dorsum of the entire hand, and there was also some bulging on the palmar aspect. On the dorsum the oedema was so gross as to give the im-

pression of apparent fluctuation. There was no lymphangitis and no epitrochlear or axillary adenitis. On account of the apparent fluctuation of the dorsum of the hand this was incised over the site of the puncture wound. No pus was obtained and very marked congestion was observed. An intramuscular injection of 20 c.cm. of anti-streptococcal serum was given along with a prophylactic injection of 1,000 units of anti-tetanus serum. The next day the patient experienced slight nausea and vomited bile-stained mucus. His temperature was then 100° F., pulse rate 104. The whole forearm was now the seat of massive oedema and quite indurated, though there was no pain. The patient slept well that night. The following day he was obviously ill and toxaemic. By this time the whole upper arm, shoulder, and clavicular region on the right side was oedematous and indurated. There was no crepitation; despite this anti-gas-gangrene serum was given. At 10.30 p.m. the patient suddenly collapsed, became cyanosed, and drooled vomit. He was obviously *in extremis*. The usual restoratives were administered, and 15 c.cm. of anti-streptococcal serum were given intravenously after 5 c.cm. of blood had been withdrawn for blood culture. The oedema of the whole upper extremity was intense, the limb having the appearance of a thigh rather than an arm. The patient died at 4 a.m. Blood culture revealed a most profuse growth of *Bacillus anthracis*.

The main points of interest in this case are: (1) the nature of the injury; (2) the absence of the development of the typical malignant pustule, with eschar, vesicles, etc.; (3) the massive oedema which was always a salient feature of the case; (4) the sudden profound toxaemia with fatal result.

Of the three types of anthrax infection the anthrax oedema, I understand, is the rarest, and I have never heard of a similar case without the presence of a malignant pustule. The case taught me a sharp lesson, and has led me to wonder if a prophylactic injection of an organic arsenical would not be advisable as a routine in all wounds of a similar nature.—I am, etc.,

Galashiels, Jan. 9. WALTER R. BLACK, M.B., Ch.B.

International Good Will

SIR,—I have been waiting in vain for an abler pen than mine to urge on you the necessity of keeping ever in our thoughts the most important subject of all, the maintenance of peace and good will among the Nations. Will you not, Sir, as Editor of the most influential medical journal in the world, use all your influence to give a lead to the profession, not only in this, but in all civilized countries?—I am, etc.,

London, N., Jan. 24. D. S. BRYAN-BROWN.

*** There can be very few readers who do not share Dr. Bryan-Brown's feeling. We shall continue to promote international good will in the world of medicine, hoping that by this means the cause of peace may be served.—ED., *B.M.J.*

The New Typography

SIR,—I suppose it is useless now to protest against the new front-page cover of the *Journal*, but I may be permitted to ask why the "constituency" was allowed no voice in the matter. If I were to contend that the old front page had attained to the dignity of a traditional landmark, to interfere with which was almost an act of vandalism, I should doubtless be told that, like myself, it was out of date, and that some outward and visible sign was required to mark the note of inward and spiritual progress which now characterizes the contents of the inside pages. Well, so be it. But why, in substitution for Sir Charles Hastings's picturesque and dignified head, must we have imposed upon us the final omega-like death wriggle of an earthworm as it emerges from beneath a garden roller? Is it too late to have a plebiscite on the subject of the retention of this fantastically ugly and wholly meaningless innovation?—I am, etc.,

London, W.1, Jan. 24. LEONARD WILLIAMS.

*** Here Dr. Leonard Williams, with disarming gaiety, records his contempt for the new cover, and suggests that the details of a complete typographical reform ought to have been submitted beforehand to 36,500 members. So far, his is almost the only discordant note in the chorus of approval.—ED., *B.M.J.*

Universities and Colleges

UNIVERSITY OF OXFORD

At a congregation held on January 21 the degree of D.M. was conferred on F. W. Brown and that of B.M. on A. H. M. Richards; and A. E. Barclay, M.D.Cantab., was incorporated as D.M.

UNIVERSITY OF CAMBRIDGE

The Appointments Committee of the Faculty of Biology "B" will shortly appoint a University Lecturer in Anatomy. Particulars of this appointment may be obtained from Dr. F. J. W. Roughton, Department of Physiology, Cambridge, to whom applications should be addressed by February 6.

At a congregation held on January 23 the following medical degrees were conferred:

M.B., B.CHIR.—D. A. S. Blair, J. Wilson, R. F. Jarrett, R. Kauntze.

M.B.—R. B. Davis, A. G. Salaman.

B. CHIR.—H. C. Maclaren, A. M. M. Payne, K. M. Mayall, K. W. B. Rostron, A. M. Barry, H. K. Meller, C. McNeil, O. N. Roussel, F. G. A. Beckett.

UNIVERSITY OF LONDON

At a meeting of the Senate held on January 20 the title of Reader in Physiology in the University was conferred on W. H. Newton, M.D., in respect of the post held by him at University College.

The degree of D.Sc. in hygiene was conferred on Thomas Bedford.

UNIVERSITY OF WALES

WELSH NATIONAL SCHOOL OF MEDICINE

The following candidates for the degrees of M.B., B.Ch. have satisfied the examiners in the subjects indicated:

HYGIENE.—Lynda B. Powell, J. Thomas.

BRITISH COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS

A quarterly meeting of the Council was held in the College House, 58, Queen Anne Street, London, on January 23, with the President, Sir Ewen Maclean, in the chair.

The following were admitted to the Membership of the College:

Gora Chand Nandi, Calcutta; Mangaldas Mehta, Bombay (*in absentia*).

The following were elected to the Membership of the College:

Geoffrey Sheddan Adam, Australia; Richard Francis William Kinkead Allen, India; Doris Crystal Bates, Manchester; Francis Arthur Bellingham, Australia; Edith Brown, India; Harold Henry Caple, Canada; William Clement, Glasgow; Duncan Iain Finlayson, Birmingham; William Frame Flint, Glasgow; Phillip Joseph Ganner, Birmingham; Arthur Lionel Gilbey, Portsmouth; Uma Pati Gupta, India; William Hunter, Newcastle-upon-Tyne; Claude Wilfred Alfred Kimbell, New Zealand; William Alexander Liston, Edinburgh; John Robertson McArthur, Canada; William Leonard MacCormac, London; Barbara Martin Macewen, London; Margaret Martin McDowell, Halifax; Kelvin Alexander McGarrity, Southend-on-Sea; Gerald Maizels, London; Gladys Helen Marchant, India; Charles Ferdinand Marks, Sheffield; William Ian Clinch Morris, Edinburgh; Harry Stafford Morton, London; Bryan Charles Murless, London; Dudley Clifford Racker, Manchester; Louis Rich, Manchester; Charles Bernard Edward Rickards, Manchester; George Walter Robson, Canada; John Myrtle Sanson,

Edinburgh; Jacobus Wynand Schabort, South Africa; Lydia Torrance, India; William Waddell, South Africa; Stanley William Wright, Newcastle, Staffs.

The Council elected five committees in India: (*a*) for the Provinces of Bengal, Assam, and Orissa; (*b*) for the Bombay Presidency; (*c*) for the Madras Presidency, Mysore, Travancore, and Hyderabad; (*d*) for the United and Central Provinces, and Bihar; (*e*) for the Punjab, North-West Frontier Province, and Sind. The function of these committees will be to consider any matter bearing upon obstetrics and gynaecology in their respective areas, and to report to the Council of the College.

Authority was given to submit a loyal address to His Majesty King George VI.

Obituary

THOMAS GOODALL NASMYTH, M.D., D.Sc.

F.R.C.P.Ed., F.R.C.S.Ed.

Late Medical Officer of Health for Fife

The death took place on January 16 at his home in Edinburgh of Dr. Thomas Goodall Nasmyth, who for many years had been well known in public affairs of Edinburgh and Fife. He was born in 1856 at Auchterderran, Fife, and after a medical course at Edinburgh graduated M.B., C.M. in 1876. After some years in practice he was appointed medical officer of health for Fife, Kinross, and Clackmannan, being the first medical officer to be appointed for this district under the Local Government (Scotland) Act of 1889. He had already taken the D.P.H. of Cambridge in 1886, and the D.Sc. (Public Health) of Edinburgh in 1887. Later he joined the Royal College of Surgeons of Edinburgh as a Fellow in 1910, and became a Fellow of the Royal College of Physicians of Edinburgh in 1913. As medical officer of health he resided in Cupar, and his work was largely connected with the health of the mining community in the county of Fife. He was a pioneer in many matters affecting public health, such as urging the formation of regional water schemes, and his work was greatly appreciated by the county council and the community which he served. During the war he acted as administrative medical officer for H.M. Munition Factory at Gretna. He held many appointments, both during his period of activity in Fife and after his retirement, when he lived in Edinburgh. He was, for example, a director of the Fife Coal Company, of the Commercial Bank of Scotland, of the Highland and Agricultural Society, and of the Scottish National Housing Company Limited. He took a great interest also in medical affairs, and at the time of his death he was chairman of the Royal Maternity and Simpson Memorial Hospital, convener of the Medical Committee of the Deaconess Hospital Board, a member of the board of the Royal (Dick) Veterinary College and of the board of the Animal Diseases Research Association of Scotland, and president of the Scottish Branch of the Society of Medical Officers of Health. He also acted as a member of various consultative committees of the Scottish Department of Health. He was frequently called as a witness to give evidence before various public committees and commissions, and made valuable suggestions before committees of the House of Commons on such subjects as the miners' eight hours day, diseases in the mining industry, and certification of death.

Dr. Nasmyth, after his retirement from the post of medical officer of health in Fife, served from 1921 to 1929 on the Edinburgh Town Council, representing Morningside Ward, where he resided. His wide experience of business and public health subjects rendered his advice particularly valuable in connexion with housing and other matters dealing with the welfare of the community, and his judgement carried great weight among his municipal colleagues. Dr. Nasmyth first joined the British Medical Association in 1888. He served on the Central Council from 1906 to 1910, and acted as representative when the Association met at Belfast in 1909 and again at Birmingham in 1911. He was a man of great physical and intellectual activity, taking a keen interest in the modern development of medical science. He found time to publish *A Manual of Public Health*. He also contributed frequently to current medical literature on subjects dealing with public health questions, such as "The Geographical Distribution of Cancer in Scotland," "Sewage Purification," "Milk-borne Diseases," and "Air of Coal Mines." He was a keen sportsman, his interests in this direction including hunting and later shooting, fishing, and curling. He was a deputy lieutenant for the city of Edinburgh and a justice of the peace for the county of Fife.

Dr. C. E. DOUGLAS sends the following appreciation:

By the death of Dr. T. G. Nasmyth there has passed one of the strongest personalities, a man of the widest capabilities and sympathies, in the profession of medicine. He returned to Fife, after local schooling here and medical training in Edinburgh, and took up practice in the mining district where his father had created the Fife Coal Company. A splendidly built young man, taking to hunting and fishing along with the rough-and-tumble work of mining practice of those days, he seemed to fill the niche quite perfectly. But he was made of other stuff. Not so much the treatment of accident and disease but their prevention became more and more his aim. Research on the condition of mines took up much of his attention: in particular his study of the air conditions of coal mines was one of the earliest researches on that subject. In those days, when the B.M.A. was but a small power in Scotland, there existed a Fife Medical Association. In this Nasmyth took a lively interest, and in the early 'eighties a petition came up to the then ruling Government from the F.M.A. praying for the creation by law of the office of a "medical officer of health," which should be a permanent appointment. In due course of time this idea was made law, and with the D.Sc. of Edinburgh and the D.P.H. of Cambridge Nasmyth left the ranks of general practice and became Fife's first medical officer of health, a post which he held until his retirement to Edinburgh, out of medicine and into the wider spheres of philanthropy, finance, and municipal politics: these in the inverse order of their importance to him. He became a Bailie, and might, had he so desired, have been supported for the Lord Provostship; but there were other things. To his keen and balanced mind finance had an attraction, and as a director of one of the Scottish banks he devoted to this much time and activity.

But if he had a great brain he had a bigger heart, and medical charities on the large scale appealed to him. The Simpson Memorial Hospital was all along his special favourite, then the little but very well managed Deaconess Hospital of the Church of Scotland came very near his heart, while the Royal (Dick) Veterinary College was largely indebted to him for help in a favourite study of his—the relation of animal to human pathology. All these and many helpful kindnesses of which nothing will be known fulfilled a busy life. One other thing, of which perhaps he was as happy as any in its way: he gave before the Royal Commission on the subject a strong

recommendation that no whisky should be released from bond less than three years old, and this was adopted in legislation, to the general advantage of humanity.

One picture of him setting forth of a morning, well on in the seventies, for a happy day's fishing with his two young grandsons gives an idea of the real Tom Nasmyth—a strong man dominated by a kindly heart. Peace be unto him.

H. W. WILTSHIRE, M.D., F.R.C.P.

Consulting Physician, King's College Hospital

Dr. Harold Waterlow Wiltshire, who died on January 18, was the son of Dr. Alfred Wiltshire, F.R.C.P., and was educated at Cheltenham College and Clare College, Cambridge. He received his clinical education at King's College Hospital, where his uncle, the late Sir David Ferrier, was a member of the honorary staff. He obtained the M.R.C.S., L.R.C.P. in 1904, the M.B., B.Ch. of Cambridge and the M.R.C.P. in 1907, and the M.D. of Cambridge in 1910. He held the posts of house-physician and house-surgeon at King's College Hospital, and subsequently was appointed Sambroke medical registrar, senior medical registrar, and medical tutor. In 1910 he was appointed assistant physician at King's, and was promoted to full physician in 1917. In 1916 he was elected to the Fellowship of the Royal College of Physicians of London.

During the great war he served with distinction in France and the Near East, holding the rank of major and being mentioned three times in dispatches. For his war services he was awarded the O.B.E. and the D.S.O. He also received the Order of St. Sava of Serbia. In 1919 he was appointed vice-dean, senior medical tutor, curator of the museum, and warden of the students' hostel at King's, and he played a prominent part in the reorganization of the teaching in the medical school. For many years he was physician to the Royal Northern Hospital. He was especially interested in the developments in cardiology which were then taking place, and was physician in charge of the cardiological department at King's College Hospital. He made contributions to the literature of many branches of medicine.

Wiltshire was a keen lawn tennis player and was a member of the team which won the Inter-hospitals Junior Tennis Cup in 1909. Unfortunately ill-health overtook him, and in 1925 he was compelled to retire from the active staff. On his retirement he was appointed consulting physician to the hospital, and lived subsequently at Bembridge, Isle of Wight. He married Ellen, daughter of Dr. Edward Tibbits of Bradford, who predeceased him. His early resignation was a great blow to King's, for with characteristic energy and thoroughness he had devoted himself after the war, in his capacity of senior medical tutor, to teaching in the medical school. No student ever turned to him in vain for advice or encouragement, and his memory will be gratefully enshrined in the hearts of many practitioners in this country and throughout the Empire. His retirement was no less a personal blow to his colleagues, who had learned to rely on his judgement and to admire his personality, and to a wide circle of patients who valued his skill and devotion.

From his student days onwards Harold Wiltshire made many friends, and retained them in later years. He was a physician of the highest type, skilled and cultured, wise and understanding, and a man who put the interests of his patients first, of his students next, and was only too apt to neglect his own—a fact which undoubtedly contributed to the breakdown of his health.

J. A. D.

DR. WILLIAM HUNTER

Mr. WALTER G. SPENCER writes: In this country we are deeply indebted to Dr. William Hunter, who from 1900 was led to recognize that the glazed red tongue which accompanies the anaemia he described no longer directs attention away from the mouth, but rather to it. Pyogenic organisms towards middle life set up suppuration between the tooth and the soft parts of the gum and the bone of the alveolus, and there is a continuous toxic absorption which sets up pyogenic gastritis. More insidious still, virulent haemolytic streptococci infect the periosteum of the gums and the tooth sockets, and become the essential cause of ill-health. Advances in *x*-ray photography now demonstrate the early disease at the apices of the teeth. Effects so widespread, so multiple, so frequent, so grave, a common source of blood infection, were laid bare by Hunter, and have since been continually added to. What was previously obscure in the cases of insidious pleural, renal, endocardial, arthritic, and ocular affections—affections chronic and persisting in spite of other treatment—has been made clear: after the judicious extraction of teeth relief has been obtained and health restored.

PROFESSOR FRASER-HARRIS

Dr. WALTER R. BETT, medical librarian, Columbia University, writes: Although separated by considerable difference in age, I felt privileged to regard the late Dr. David Fraser-Harris as one of my intimate friends. With his vivacious and friendly personality he found it easy to extract a rich fund of interest, variety, and pleasure out of life. His curiosity was insatiable, his imagination lively, and he carried his years with amazing indifference. The circumstances of his life enhanced his natural talent for adapting himself with ease to the various types and conditions of society. He knew how to be young in heart with the young, serious with the learned, and simple with those eager for information. While never profound, his knowledge was extensive and bizarre. It was as a popular lecturer that he excelled, for he was fluent, dramatic, and entertaining.

Dr. W. JENKINS OLIVER, M.R.C.P., the son of Sir Thomas Oliver, died in Newcastle-upon-Tyne after a brief illness. He was educated at Winchester and Oxford, where he graduated M.A., B.M., B.Ch. in 1911, and was a keen and exceptionally able dermatologist. He had not, however, practised in England for many years, and much of each year was spent abroad in Norway, and Denmark. Dr. Claude Lillingston has contributed the following outline of part of his career: "Oliver was a great little man. Rumour had told me of a hermit Englishman who spent from May to October each year in an out-of-the-way spot in an out-of-the-way fjord on the west coast of Norway. Some five years ago I ran him to earth in this spot in a Stanley-greets-Livingstone atmosphere. His salmon-fishing was so much of an avocation that I doubt if his average was one fish a month. His vocation was quite another thing. He had discovered this spot before the great war, had mastered colloquial Norwegian almost to perfection, and had become so much one of the peasant community in which he lived that few knew its inner life better. To his keen personal interest in all his neighbours he added a medical interest, and when the local doctor took his annual holiday Oliver was his locumtenent—much to the honour of the English medical profession. His dry and kindly sense of humour had an irresistible appeal, and was a wonderful vehicle for the sound advice he gave. Doubtless his scientific gifts would sooner or later have spelt success had he remained in London as a dermatologist, but his was not a conventional estimate of values, and the happiness he gave and himself enjoyed in his summer home was surely success of the best. His frail physique and a shoulder which went out of joint on the slightest provocation would have made a lame dog of most men, but Oliver just laughed at these disabilities and made good."

Dr. JAMES MCNIDDER, one of the oldest and best known of the general practitioners in Hull, died at his home on January 22. After studying medicine at the University of Edinburgh and the London Hospital he graduated M.B., C.M.Ed. in 1889, and took the M.D. with commendation in 1905. In his early days of practice he had held resident posts at the West Riding Asylum at Wakefield and at the Victoria Hospital for Sick Children, Hull. He was for many years honorary physician to the Seamen's and General Orphanage, medical officer to the Hull and Sculcoates Dispensary and the municipal hospitals, and medical inspector under the local education authority. Dr. McNidder joined the British Medical Association in 1890, and was honorary secretary of the East Yorkshire and North Lincolnshire Branch from 1920 to 1931, and of the East Yorkshire Division from 1920 to 1923. He acted as representative of the Division at the Annual Meetings of the Association on thirteen occasions, the first being at Oxford in 1904 and the last at the Centenary Meeting in London in 1932. He was for many years a leading figure in the Hull Medical Society, and held office as honorary secretary and as president.

Dr. WILLIAM VERNON SHAW, a member of the medical staff of the Ministry of Health, died of pneumonia on January 21 following an attack of influenza. Dr. Shaw, who was 63, had a brilliant career at Oxford, where he gained first-class honours in the School of Natural Science, and at St. Mary's Hospital. After graduating M.B., B.Ch. in 1900, and M.A., M.D. in 1903, he was casualty physician at St. Mary's. He had a distinguished career in the public medical service, first as medical officer of health for the Malton and Norton Rural District, and later at the Ministry of Health. Dr. Shaw was an expert epidemiologist, and did valuable work for the Ministry in the investigation of outbreaks of infectious disease in many parts of the country. His diagnostic skill, particularly in small-pox, was recognized far and wide. He did important work in connexion with the outbreak of typhoid at Bournemouth during last summer.

Dr. WILLIAM RICHARDSON, who died in London on January 6 after a long illness, had been medical superintendent of the Isle of Man Mental Hospital for thirty-two years. He was born in 1856 and studied medicine at the University of Edinburgh, graduating M.B. and C.M. with first-class honours and the Ettles scholarship in 1877, and going on to the M.D. with special commendation in 1884. Not content with these degrees he obtained the B.Sc. in public health at Edinburgh in 1888 and the M.R.C.S.Eng. diploma. Before taking up his appointment in the Isle of Man Dr. Richardson had been assistant medical officer at the Crichton Royal Institution, Dumfries, the Border Counties Asylum, Melrose, and at Ticehurst House, Sussex. He was for many years attached to the 7th Volunteer Battalion of the King's Liverpool Regiment, retiring as surgeon-major with the Volunteer Decoration. Before giving up active work he had been a member of the British Medical Association for just on fifty years.

Dr. CHARLES JAMES MILLIGAN died at his residence, Ligoniel, Belfast, on January 7, and thus has been removed another of the well-known and popular general practitioners from the older generation of Belfast doctors. Dr. Milligan obtained the Scottish triple qualification as long ago as 1888, and shortly after setting up in practice in the Ligoniel district was appointed dispensary medical officer. About a year ago he felt that his general health was not sufficiently robust to continue practice, and he retired from his various public appointments and private practice, much to the regret of the inhabitants of the district, to whom he had been physician, friend, and adviser for nearly fifty years. Dr. Milligan had a wide circle of friends outside his medical colleagues, and adopted an enthusiastic attitude towards outdoor sports and games, which received his whole-hearted encouragement and support. His hobby was pigeons, and pigeon racing, angling, and shooting were pastimes which he enjoyed to the full and which he followed with interest. His death is deeply regretted by his professional colleagues in Belfast, and the sympathy of all is extended to his widow and three sons.

Medico-Legal

DAMAGES AGAINST AN UNQUALIFIED HEALER

A jury awarded on January 20 £490 damages and costs against a Mr. G. C. Foster of Walthamstow, a "nature cure practitioner," for negligence in advice and treatment whereby a patient had to have his left leg amputated above the knee.

Mr. F. W. Sones, the patient, said that the trouble had started with a corn on the little toe of the left foot, which had become septic, and he had spent nine weeks in Mr. Foster's house under treatment at eight guineas a week. On August 17, when he arrived, an attendant sprayed the foot with antiseptic and administered a hot compress, applying a poultice at about midnight. Mr. Foster during the first six days had used a nail brush, which caused intense pain, about five times a day, and had then sprayed the foot and applied hot compresses. On one occasion Mr. Foster had inserted the foot in antiseptic and cut off a quantity of skin, afterwards pressing the foot by force into almost boiling water. Other operations were performed for cutting off mortified skin under the foot and toes, and a little toe which had become necrotic. On October 22 Mr. Sones had been taken to St. Bartholomew's Hospital, where his leg was amputated, and he returned home after convalescence on December 11. He had paid some £70 to Mr. Foster for these useless and harmful services. Mr. R. H. Dale, a member of the resident staff of St. Bartholomew's Hospital, said that Mr. Sones was suffering from arteriosclerosis, and had gangrene as far back as the ankle. If an operation had been performed when Mr. Sones first went to Mr. Foster it would probably have been safe to amputate seven inches below the knee. The nail brush was not good treatment and was likely to do harm. Mr. Sones was an extremely good patient who tended to be stoical about pain.

Mr. Foster gave evidence, and called witnesses to show that he was a "naturopath," a medical herbalist, and a health practitioner, that he had practised nature cure for sixteen years, and that no complaint of his treatment had ever been made before. He had never held himself out as a qualified medical practitioner. When he had first examined Mr. Sones mortification had extended to the ankle and inflammation to just below the knee-cap. Two of the toes had been hanging on by the merest fraction of a diseased ligament. There were patches of pus. Mr. Sones's general condition was deplorable: he had gastritis, nervous prostration, and "catarrh of the liver." Mr. Foster had at once considered that amputation was necessary but that the patient could not stand it. He had dusted the leg with iodoform and encased it in a boracic dressing, then dressed it with yeast and charcoal poultices, and later bathed it with antiseptic. One of the toes had dropped off in a poultice, and he had cut off the other toe with correct instruments. The water into which he had put Mr. Sones's foot had been only just about blood heat by the thermometer. During his nine weeks' treatment he had localized the gangrene below the ankle, and Mr. Sones's general health was as good as possible considering his arteriosclerosis. He had never been anxious to take the case and had used the best skill of which he was capable.

Legal View of Unorthodox Practice

Mr. Justice Atkinson, in summing up, warned the jury that they must not consider any of the evidence which had been directed to show that Mr. Foster had represented

himself to be a registered practitioner, for the patient had not alleged this in bringing the case. He reminded them that, although the orthodox medical profession liked to think itself the sole repository of knowledge of the art of healing, there were undoubtedly unorthodox practitioners who rendered great public service. Professional osteopaths were an example, and the same might be said of naturopaths, who combined herbalism with nature treatment, and the more reputable of them had formed themselves into associations which did their best to create standards. No one need consult these practitioners unless he liked; a patient who consulted one had the right to expect the average skill, knowledge, and efficiency of the body of naturopaths to which the practitioner belonged.

The jury found that Mr. Foster had been guilty of breach of duty in the advice and treatment he gave Mr. Sones, and awarded the patient a return of £40 of the fees he had paid, £50 for unnecessary pain and suffering, and £400 for the loss of his knee.

DANGERS OF UROSELECTAN B

A HIGH COURT CASE

Mr. Justice Finlay gave judgement on January 11 in the King's Bench Division for £800 damages and costs against a young house-surgeon in an action for negligence brought by a former patient.

The man was admitted to the Manchester Royal Infirmary last February for intravenous pyelography. The surgeon had some difficulty in finding the cubital vein, and when he finally injected about 5 c.cm. of a 20-c.cm. dose of uroselectan B in the left arm the patient complained of great pain. He tried to find a vein in the other arm and at the ankle, and finally returned to the left arm and made another injection, which also produced pain. After the *x*-ray examination the patient was sent home. As his arm was inflamed he consulted his own doctor, who diagnosed median nerve paralysis. An operation was performed on July 3 and the nerve was found embedded in scar tissue. Witnesses put the prospect of recovery between a year and eighteen months. For the defence it was said that the doctor was the best house-surgeon the hospital had had for many years. He had done about twenty-four of these injections without trouble, and paralysis of the median nerve had never before been observed as a consequence of injecting uroselectan B outside a vein. The patient complained of pain immediately the needle was put in, and when the test for patency was satisfactory the doctor proceeded with the injection. On finding a second patency test unsatisfactory he withdrew the needle and tested the other arm, but could not find a patent vein and so returned to the left arm. The drug must have entered the blood stream, as the skiagram was a success. Complaints of pain were frequent at these injections, and he did not think that the patient's pain was due to leakage into the tissues. If he had known that the patient might have median nerve paralysis he would have made an incision.

In his judgement, reserved from the December Assizes at Manchester, Mr. Justice Finlay said that the leakage of the fluid into the tissues was a misfortune, but the injury was not one which the doctor could reasonably have anticipated. He had committed negligence, however, in ignoring the patient's continual complaints of pain. It was an error of judgement to treat them merely as the expressions of a hypersensitive patient, but not reprehensible negligence, and the doctor was unfortunate that his error should have led to such grave consequences. The escape of fluid in such large quantities could have been avoided if the doctor had paid more attention to the complaints of pain. In conclusion, the learned judge hoped that the action would not affect in any way a very promising career, as it should not.

Medical men will feel great sympathy for their colleague. Uroselectan B is a pyridine derivative containing 51½ per cent. of iodine in close organic combination. It must have been used in hundreds of thousands of radiographic investigations since its introduction a few years ago, and although slight and transient disturbances have occasionally been noted, and sometimes ulceration and sloughing, median nerve paralysis has, so far as we know, been quite unknown. In the present case it was caused by the constriction of the scar tissue which formed at the site of the puncture. Veins are often difficult to find and painful leakage of fluid is not uncommon. If there is any lesson to be drawn from the case, it is that repeated complaint of severe and continued pain must be regarded as a serious warning. The doctor seems to have been the victim of one of those rare anomalies that happen in the use even of the safest drugs.

Medical Notes in Parliament

The House of Lords reassembled after the Christmas recess on January 26, when the Lord Chancellor resumed his seat on the Woolsack after a long illness. On the same day a message from the King was read in both Houses which recommended Parliament to make permanent provision for exercise of the Royal Authority during any illness of the Sovereign or his absence from the Realm and also during the minority of a Sovereign. The message referred to the setting up of a Regency Council during the illness of King George V in 1928 and during his last illness in 1936. The Government arranged to introduce a Regency Bill in the House of Commons.

In the House of Commons the first place in the ballot for leave to move motions on January 20 fell to Mr. Shinwell, who proposed a resolution advocating provision of at least one meal a day for school children. The third place fell to Sir Francis Fremantle, who desired to call attention to the neglect of the report of the Committee on Satellite Cities.

Wing Commander James gave notice that when the House went into committee on the Civil Estimates he would call attention to the need for implementing the report of the Brock Committee on Voluntary Sterilization. Mr. Rowson proposed on the same occasion to call attention to the question of nutrition.

The Road Traffic Bill and the Inheritance (Family Provision) Bill, introduced respectively by Colonel Moore-Brabazon and Mr. W. Windsor, each received a second reading in the House of Commons on January 22.

The Unemployment Assistance (Temporary Provisions) (Amendment) Bill was read a second time on January 25. The Maternity Service (Scotland) Bill, a Government measure, was down for second reading in the Commons on January 28, and the Deaf Children School Attendance Bill on January 29. Other subjects discussed by the Commons this week included discharges from the Royal dockyards, Empire settlement, and the new duties on foreign beef and veal. During this last discussion reference was made to the importation of liver for production of remedies against pernicious anaemia.

In the House of Commons on January 26 Mr. Groves presented a petition signed by 19,515 citizens in this country asking Parliament to abolish the present powers for experiments on dogs.

A circular drawing the attention of local authorities to their powers and duties under the Public Health Act, 1936, in respect of offices is in preparation, and will be issued well in advance of October 1, the date on which the Act comes into force.

The Government hopes shortly to lay before Parliament its proposals for national physical training.

Assistance for Voluntary Hospitals in Special Areas

Asked on January 21 whether the Commissioner for the Special Areas had made grants to voluntary hospitals towards the alteration or extension of their buildings, Mr. ERNEST BROWN said that particulars of the earlier decisions were found in the third report of the Commissioner for Special Areas (England and Wales). This covered the period to September 30, 1936. Schemes for assisting voluntary hospitals similarly approved since that date were:

Hospital	Nature of Work	Location of Work	Estimated total cost
Sunderland Royal Infirmary	Construction of new out-patient department, ward block, nurses' home, and staff quarters.	Sunderland	£83,500
Blaina and District Hospital	Additions to surgeon's room and mortuary, provision of ultra-violet ray and other equipment, and new motor ambulance.	Blaina	£874
Rhymney Cottage Hospital	Provision of new *x*-ray room, nurses' bedroom, new ambulance, and other equipment	Rhymney	£2,067

Thefts of Drugs from Doctors' Cars

Mr. RHYS DAVIES asked on January 21 whether the Home Secretary proposed any action to prevent the recurrence of cases in which members of the medical profession had dangerous drugs stolen from their motor cars. Sir JOHN SIMON said he had no grounds for thinking that these thefts were other than ordinary cases of petty larceny. There was no action he could usefully take in the matter. Mr. DAVIES asked whether some responsibility should not be placed on the medical profession for neglecting to take care of these dangerous drugs. Sir JOHN SIMON replied that the remedy was exercise of care by the individual who had such a package in his charge. When he considered how many skilled doctors were moving about attending medical cases and how many had something of the sort with them he did not deem the number of thefts to be very surprising.

Drunkenness as a Ground for Divorce

Consideration of the Marriage Bill was resumed in a standing committee of the House of Commons on January 21. Mr. A. P. Herbert mentioned that the two other members who sponsored the Bill were absent because of influenza.

On Clause 2—grounds of petition for divorce—the committee continued to discuss an amendment, previously moved by Mr. Spens, to omit from the grounds of petition for divorce the ground that the respondent

> "(*e*) is an incurable habitual drunkard and has for a period of at least three years been separated from the petitioner in consequence of habitual drunkenness."

Mr. SPENS said it would be difficult to get a common "yard-stick" with which to measure the amount of drunkenness which ought to constitute a ground for final dissolution of marriage.

Mr. HERBERT said that if the paragraph stood with the omission of the word "incurable" habitual drunkenness would be ground for a petition and the term "habitual drunkard" was strictly defined in the interpretation clause. For the purpose of separation orders the Statute Book defined "habitual drunkard" and used the words that the person "is at times a danger to himself and others." The words in the interpretation clause of this Bill were, "is habitually a danger to himself and others." Once the state of affairs had been established and in consequence a separation had followed, there would have to be a three-year interval, after which the applicant for divorce must show that the same state of things still existed, which would be difficult to do. Under the Summary Jurisdiction Act and the Licensing Act of 1902 it was possible for a husband or wife to get a non-cohabitation order or separation order on the ground of habitual drunkenness. Only fifty-three such orders were made in 1934, forty-two being granted to husbands and eleven to wives. Few people now attained to the degree of drunkenness which these Acts contemplated. The problem of drunkenness was far less serious now than when the Royal Commission on Divorce reported.

After further debate the Solicitor-General, Sir TERENCE O'CONNOR, said little difference would be made whether the words under discussion were retained or deleted. There was a difficulty in defining "habitual drunkard," and a great many cases involving the difficulty would be covered by a cruelty paragraph of the present Bill. Partners of drunken brutes could go to the court and make out a case of constructive cruelty which was damaging to health. The very definition of habitual drunkenness which appeared in the clause under discussion would in his opinion constitute desertion in the great majority of cases. When the husband constantly came home drunk and made the home impossible to live in constructive desertion occurred, as Lord Merrivale had ruled.

The amendment to strike out Clause 2 (*e*) was carried without a division.

After further amendment Clause 2 was ordered to stand part of the Bill.

The sitting of the Committee on January 26 was occupied in a general discussion.

Capitation Fee for Young Persons

Mr. RHYS DAVIES asked on January 21 whether the Minister of Health had been able to secure agreement with the medical profession in relation to the fees to be paid in respect of young persons entering into employment for the first time. Sir KINGSLEY WOOD answered that he was still in communication with representatives of the medical profession on this matter and was not yet in a position to make a statement.

Local Authorities' Air Raid Protection Schemes

On January 25 Mr. LLOYD informed Mr. Levy that out of 174 county councils and county and metropolitan borough councils about 100 had submitted schemes to the department for advice and assistance concerning the protection of the civilian population in air raids.

The only county borough which at present had intimated that it would not co-operate was Barnsley. At present the attitude of the Home Office was that the co-operation which the office had received from local authorities throughout the country had been developing in the right direction so satisfactorily in recent months that it would prefer to rely on the development of public opinion in the areas concerned to bring the other authorities into line. The Home Secretary was at present considering representations made by a deputation in regard to cost to local authorities. The preparation of a scheme such as had been asked for by the Home Office did not involve much more than the time of certain local officials.

Small-pox at Oldham.—Sir KINGSLEY WOOD told Mr. Tom Groves on January 19 that the first case of small-pox in the recent outbreak at Oldham was notified on November 27, 1936. This patient was probably infected about twenty-three days earlier, the interval including the period of incubation, when there were no clinical manifestations. Nine cases in all had been notified at Oldham.

Doncaster Scarlet Fever Outbreak.—In an answer to Mr. Alfred Short on January 21 Sir KINGSLEY WOOD said 160 cases of scarlet fever occurred in Doncaster and the adjoining rural district in a recent outbreak, together with a considerable number of cases of sore throat. The outbreak was due to infection of milk from one farm. When that milk supply had been identified as the source of infection arrangements were made for pasteurization of all milk from that source. He could not say more at present about steps to prevent similar outbreaks.

Staff Accommodation at Ministry of Health.—In a reply to Commander Fletcher on January 21 Sir KINGSLEY WOOD said he had from time to time received representations from the Departmental Whitley Council about the accommodation provided for the staff at the Ministry of Health. Such representations were considered and, where necessary, brought to the notice of the Office of Works. In general the accommodation in the Ministry was satisfactory. About fifty to fifty-five clerks spent a normal working day of about six hours for three months at a time in the basement courts, which were large, light, and well-ventilated rooms. There was no overcrowding in any part of the Department. Natural lighting in the rooms was generally good, and in only a small proportion was it necessary for any officer to resort to artificial light all day under normal weather conditions. He was not aware of any outstanding complaints.

Sight-testing Opticians.—Mr. WALTER ELLIOT told Mr. Henderson Stewart on January 22 that he had received certain representations from opticians regarding the new draft regulations as they affected sight-testing opticians. He had arranged to receive a deputation from Scottish opticians on this subject. On January 26 Captain MACNAMARA asked the Minister of Health if he was aware of the anxiety among opticians of the country at the new draft regulations concerning the payment of their services for ophthalmic treatment; and whether he would give an assurance that their position would be regularized in the new regulations, so that there would be no doubt about the legality of their claim for service fees in the future. Mr. R. S. HUDSON replied that there had never been any intention of depriving opticians of a fee for services rendered by them in connexion with the supply of glasses to insured persons, but some doubt had been expressed about the position under the proposed regulations. The matter was receiving the careful consideration of the Minister of Health and of the Secretary of State for Scotland. If they were satisfied that some modification of the wording of the draft regulations was required to legalize the payment of such a fee the necessary modification would be embodied in the substantive regulations.

The Services

D.A.D.G., ARMY MEDICAL SERVICES

Major G. T. Garraway, R.A.M.C., has been appointed Deputy Assistant Director-General, Army Medical Services, War Office.

DEATH IN THE SERVICES

Lieut.-Colonel WILLIAM KEAYS, R.A.M.C. (ret.), died at Keynsham, Somerset, on January 14, aged 86. He was born on January 12, 1851, was educated at the Ledwich Medical School, Dublin, and took the L.R.C.S.I. and L.K.Q.C.P. in 1874; also subsequently the M.R.C.P.I. in 1879 and the F.R.C.S.I. in 1886. He entered the Army as surgeon on February 3, 1878, passing first into Netley, became lieutenant-colonel after twenty years' service, and retired on June 11, 1904. While on the retired list he was employed at Weymouth from 1909 till 1912. He served in the Egyptian war of 1882, gaining the medal and the Khedive's bronze star; and in the Sudan campaign of 1885, at Suakin, when he received a clasp to the Egyptian medal. When the war of 1914–18 began he rejoined for service, and was employed at Bristol, first on recruiting duties and later as chairman of the Pensions Board.

Lieut.-Colonel RICHARD FRANCIS ELLERY, R.A.M.C. (ret.), died on January 7, aged 62, in Bristol Infirmary, of pulmonary embolism after an operation. He was born on October 7, 1874, and was educated at Bart's, and took the L.S.A. in 1900. Entering the R.A.M.C. as lieutenant on June 21, 1900, he became lieutenant-colonel on May 2, 1918, and retired on March 1, 1923. He served throughout the war of 1914–18. He was living, before his last illness, at Martock, in Somerset. He was a member of the British Medical Association for twenty years.

Medical News

Deaths from influenza in London for the week ending January 23 were 273, as compared with 344 in the previous week, and notifications of pneumonia 328 as compared with 449. The figures for 122 large towns in England and Wales, including London, are 1,135 deaths from influenza for the week ending January 23, as compared with 1,100 for the previous week.

A reception will be held at the Royal Society of Medicine on Thursday, February 11, at 8.30 p.m., when Fellows and their friends will be received in the Library by the president, Sir John Parsons. At 9.15 p.m. an illustrated address will be given by Professor T. Graham Brown on "Climbing in Three Continents." Admission will be by ticket only, and the secretary will deal with applications in strict rotation.

On the afternoon of Friday, February 5, the Right Hon. Herbert Morrison, M.P., Leader of the London County Council, will perform the ceremony of opening the new nurses' home at Friern Hospital, New Southgate, N.11 (formerly, until the end of 1936, known as Colney Hatch Hospital). The home has been planned on modern lines to avoid, so far as possible, overlooking the hospital buildings, and sleeping accommodation is provided for 117 nurses. The scattered quarters which nurses have hitherto occupied will be adapted to accommodate additional women patients.

The tenth annual meeting of the Association of Clinical Pathologists is being held on Friday and Saturday of this week at the British Post-Graduate Medical School, Ducane Road, Hammersmith, W. The subjects for discussion are the diagnosis of gonorrhoea, the diagnosis of syphilis, and the present and future status of the clinical pathologist.

A meeting of the Listerian Society of King's College Hospital will be held in the large lecture theatre of the hospital on Wednesday, February 10, at 8.30 p.m., when Dr. Alan Gregg, medical secretary of the Rockefeller Foundation, will give an address on "Psychological Research." The chair will be taken by Dr. Edward Mapother, and members of other medical societies and the profession are invited to attend.

A course on electrocardiography will be held by Professor Weber at Bad Nauheim from March 9 to 12.

Mr. Olaf F. Bloch, head of the research laboratory of Ilford Ltd., will read a paper on "Applications of Photography to Scientific and Technical Problems" at the Royal Society of Arts, John Street, Adelphi, on Wednesday, February 10, at 8.15 p.m. The paper will be illustrated by lantern slides and cinematograph demonstrations. Applications for tickets should be made to the Secretary, Royal Society of Arts, John Street, Adelphi, W.C.2.

At a meeting of the Association of Industrial Medical Officers at the London School of Hygiene and Tropical Medicine on January 22 Professor Millais Culpin and Dr. May Smith read two interesting papers on the application of psychology to industrial problems. During the dinner that followed the meeting Professor W. W. Jameson, on behalf of the association, presented a silver tray to Dr. N. Howard Mummery, who is retiring from the chairmanship of the association. His successor in the chair is Dr. L. P. Lockhart.

Dr. J. Matthewson Webster, whole-time police surgeon for Sheffield and lecturer in forensic medicine at the University of Sheffield, has been appointed to take charge of the Home Office laboratory which is being established in Birmingham to serve the police forces in the West Midlands. The Sheffield Watch Committee has accepted Dr. Webster's resignation, to take effect on March 31.

On the occasion of the thirtieth anniversary of the foundation of the Luigi Mangiagalli Obstetrical and Gynaecological Clinic at Milan a special issue of the *Annali di Ostetricia e Ginecologia* has been published consisting of 956 pages, and containing twenty papers illustrating the various activities of the clinic.

The issue of the *Nederlandsch Tijdschrift voor Geneeskunde*, the organ of the Dutch Medical Association, for January 16 contains a sympathetic obituary notice of Sir Grafton Elliot Smith, by Dr. C. Winkler.

General Mazzetti has been recently nominated director-general of the Italian Army Health Service in succession to Professor Franckel.

Dr. Gosset, professor of clinical surgery in the Paris faculty of medicine, and surgeon to La Salpêtrière, Paris, has been presented with a sword of honour by his pupils and friends on the occasion of his election to the Académie des Sciences.

Sir Ernest Graham-Little, M.P., has been elected a member *honoris causa* of the Polish Dermatological Society.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.

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QUERIES AND ANSWERS

Dermatitis of the Feet

Dr. G. FRANCIS SMITH writes in reply to "H. A." (January 23, p. 202): The soles of the feet should be dusted with the ordinary "boric acid, starch, and oxide of zinc" powder immediately before gymnastic work, and the patient should wear a loofah sock, procurable at any boot shop, inside the rubber shoe. Care should also be taken that only dye-fast stockings be worn.

Income Tax

Fees Earned after Retirement

"RETIRED G.P." has received on two occasions since his retirement £31 in all for expenses and (presumably) services in connexion with a legal dispute. Is he liable to tax thereon?

*** The point can be disputed on the technical ground that it is difficult to fit such a case into the statutory division of income. On the whole, we think that the revenue authorities could show good cause for including in his income tax liability such portions of the total amount as fairly represent a payment for time and professional services. The liability would be under Schedule D, and probably under Case VI of that schedule—"profits or gains not falling under any of the foregoing cases."

LETTERS, NOTES, ETC.

Epidemic Appendicitis

Dr. J. R. D. WEBB (Didcot, Berks) writes: Seeing the abstract of an article on epidemic appendicitis (*Epitome*, December 26, 1936, para 521) reminds me of a similar occurrence on a smaller scale in rural Berkshire. In the month of October, 1936, I saw in rapid succession six cases of acute appendicitis which I concluded must be of epidemic character. They were directly associated with each other. The first case appeared in a farm labourer aged 26, previously in perfect health. He seemed clinically to be an indefinite case of gastro-enteritis. Suspecting a possible appendicitis I visited him three times daily. I found nothing definite in his signs and symptoms at these visits. On the third day the appendix perforated; he was operated upon at once, but died. The second case occurred in the same house in a few days. The mother of the labourer developed a similar gastro-intestinal attack. She was at once admitted to hospital, and on operation a gangrenous appendix was removed and she recovered. The third case was the young labourer's fiancée. She showed definite signs of an acute appendicitis. She was treated by conservative measures and recovered. The fourth, fifth, and sixth cases followed in rapid succession; all were admitted to hospital and were successfully operated on. No cause could be found for these six cases of apparent epidemic appendicitis. In rural England appendicitis has become a popular complaint in farm-hands and domestics, the signs and symptoms developing consciously or subconsciously, and some surgeons declare that of all appendices removed from such subjects only 40 per cent. are found diseased. I do not believe that these six cases here recorded were in this "psychological-appendix" group.

Treatment of Peptic Ulcer

Dr. H. W. HALES (London, W.1) writes: My attention has been drawn to Dr. Hort's letter published in the *Journal* of December 12, 1936 (p. 1228). May I be permitted to endorse his views as to the value of colonic lavage with potassium permanganate in gastric and duodenal ulcer. By combining this technique with suitable, reduced vegetarian diet, and perhaps duodenal intubation and feeding, I have succeeded in obtaining results which seem to have rendered surgery and alkalis unnecessary. I regard gastric and duodenal ulcers as toxic in origin and primarily dependent on intestinal toxaemia.

Treatment of Pyorrhoea

Lieut.-Colonel H. H. KING, C.I.E., I.M.S. (ret.), writes from Beasonsfield: In looking over old papers I found I had made a note of the value of forcible irrigation in a case of pyorrhoea alveolaris in an Indian in East Africa during the war. It was a most acute case that rapidly improved under repeated irrigation with dilute peroxide given forcibly from a four-ounce ear syringe, with the nozzle set against the teeth so that the solution squirted into the tooth sockets between the teeth and the gums—the patient meantime hanging his head out of bed over a bucket. Perhaps this observation of the use of irrigation with pressure—and, as your readers are aware, considerable pressure can be attained with a four-ounce syringe—is of sufficient interest to merit record.

Calcium Aspirin

In our issue of January 9 (p. 77) we stated in relation to calcium aspirin that "The manufacturers, Genatosan Ltd. of Loughborough, have now succeeded in preparing the drug in a stable form." The manufacturers have written to us pointing out that the work referred to was done by Myer Coplans and Green (*J. Soc. chem. Indust.*, 1935, **54**, 805), and that Messrs. Genatosan are the sole manufacturers and distributors of the product.

Disclaimer

Dr. A. C. MAGIAN writes from Manchester to disclaim responsibility for notices which have appeared in the lay press with reference to his work in a local hospital.